United States Department of the Interior

FISH AND WILDLIFE SERVICE
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IN REPLY REFER TO:
81420-2009-F-0192-2

JAN 15 2009

Mr. Jim Richards
Attn: Margaret Gabil
Office of Biological Sciences and Permits
California Department of Transportation
P.O. Box 23660
Oakland, CA 94623-0660

Subject: Biological Opinion on the Effects of the Proposed State Route 152/Ferguson Road Intersection Realignment and Signalization Project, Santa Clara County, California (Caltrans EA 2A2600) on the Threatened California Red-Legged Frog, Threatened California Tiger Salamander, Endangered Least-Bell's Vireo, and the Endangered San Joaquin Kit Fox.

Dear Mr. Richards:

This letter responds to a letter from the California Department of Transportation (Caltrans), dated August 25, 2008, which requested formal consultation for the proposed State Route 152/Ferguson Road Intersection Realignment and Signalization Project, Santa Clara County, California. Your letter was received by the U.S. Fish and Wildlife Service (Service) on August 27, 2008. This document represents the Service's biological opinion on the effects of the project on the endangered San Joaquin kit fox (*Vulpes macrotis mutica*), endangered least Bell's vireo (*Vireo bellii pusillus*), threatened California red-legged frog (*Rana aurora draytonii*), and threatened California tiger salamander (*Ambystoma californiense*). Our comments and recommendations are made under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act).

Based on the information provided in the August 2008 biological assessment, the letter from Caltrans to the Service dated December 26, 2008, and email and phone correspondence between the Service and Caltrans, the Service concurs that the project as proposed would have no effect on the least Bell's vireo based on the absence of suitable habitat within the action area and is not likely to adversely affect the San Joaquin kit fox based on discountable effects (take in the form of harm and harassment are not expected to occur) and the proposed avoidance and minimization measures. At the request of the Service, Caltrans provided additional information regarding habitat suitability along Jones Creek for least Bell's vireo. Caltrans determined that habitat within this reach of Jones Creek is characterized by low growing herbaceous vegetation with

scattered shrubs and willows. The riparian corridor lacks the structural diverse canopy and dense, typically early successional, shrub cover dominated by cottonwood/willow, oak woodland, and mulefat scrub required by this species.

This biological opinion is based on: (1) the *Biological Assessment: Santa Clara 152 / Ferguson Road Intersection Realignment and Signalization Project* dated August 2008 (EA 2A2600); (2) letter from Caltrans to the Service dated December 26, 2008; (3) miscellaneous correspondence and electronic mail concerning the proposed action between Caltrans and the Service; and (4) other information available to the Service.

CONSULTATION HISTORY

August 27, 2008	The Service received a request for formal consultation on the proposed project and received the biological assessment for the proposed project.
December 3, 2008	The Service sent Caltrans a request for additional information relating to data deficiencies in the project description, action area, and adverse affects to listed species. The Service also concurred with the likely to adversely affect determination for the California red-legged frog and with the no effect determination for the California least tern, marbled murrelet, delta smelt, Bay checkerspot butterfly, Tiburon paintbrush, coyote ceanothus, Santa Clara Valley dudleya, Santa Cruz tarplant, two-fork clover, Metcalf Canyon jewelflower, and California red-legged frog and California tiger salamander critical habitat. The Service indicated that it was unable to concur with the no effect determination for the California tiger salamander and least Bell's vireo, and the not likely to adversely affect determination for the San Joaquin kit fox based on the information and rationale presented in the biological assessment and recommended Caltrans to re-evaluate the assessment for these species.
December 3-29, 2008	Telephone conversations between Margaret Gabil of Caltrans and Jerry Roe of the Service regarding the action agency's responsibilities in regards to effect determinations and the Service's mandate to manage threatened and endangered species under the Endangered Species Act. Discussions addressed the no effect determination for the California tiger salamander and least Bell's vireo, and the not likely to adversely affect determination for the San Joaquin kit fox. The Service suggested that Caltrans elevate the determination for California tiger salamander to not likely to adversely affect based on suitable habitat within dispersal range of the project footprint and implementation of the proposed conservation measures for California red-legged frog, which suggest that the foreseeable impacts to this species would qualify as insignificant and discountable. The Service suggested that Caltrans elevate the determination for San Joaquin kit fox be elevated to likely to adversely affect based on presence data within the vicinity of the project and road killed individual reported at the Shore Road and Frazier Lake Road intersection in 1991 approximately 6 miles to the south and the proximity of the project site to suitable kit fox habitat. Based on additional information it was agreed that the no effect determination for the least Bell's vireo was appropriate.
December 19, 2008 - January 15, 2009	Electronic and phone correspondence between Jim Richards, Jeff Jensen, Margaret Gabil, and Katie Thoreson of Caltrans, and Susan Moore, Cay Goude, Chris Nagano, Ryan Olah, and Jerry Roe of the

	Service, regarding Caltrans' no effect determination for the California tiger salamander, not likely to adversely affect determination for the San Joaquin kit fox, and proposed compensation for project effects to listed species.
December 29, 2008	The Service received a response from Caltrans addressing the data deficiencies and additional information requested in the 30-day letter sent from the Service.
January 5, 2009	Jerry Roe of the Service sent Margaret Gabil of Caltrans via electronic correspondence a draft copy of the biological opinion.
January 15, 2009	Jerry Roe of the Service received a phone call from Jeff Jensen of Caltrans and Rebecca Verity of URS Corporation to discuss the reasoning behind the environmental baseline and effects of the action for the San Joaquin kit fox and California tiger salamander. Mr. Roe explained that there was a reasonable certainty for take to occur of both species as a direct or indirect result of the proposed project based on the best commercially available science and the expertise of the Service.
January 15, 2009	Cay Goude of the Service spoke with Jim Richards of Caltrans regarding Caltrans' determination of no effect for the California tiger salamander and not likely to adversely affect for the San Joaquin kit fox. The Service agreed based on the lack of kit fox sightings in the project vicinity newer than 18 years and the proposed avoidance and minimization measures that the not likely to adversely affect determination for the San Joaquin kit fox was appropriate. Caltrans agreed based on on-site habitat suitability, occurrence records, absence of movement barriers, prevalence of California tiger salamanders within the eastern foothills, potential breeding habitat within the maximum dispersal range of 1.3 miles from the action area, and lack of protocol presence/absence surveys that the project is likely to adversely affect the California tiger salamander.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Caltrans is proposing to complete a left turn pocket and other safety improvements at the intersection of State Route (SR) 152 and Ferguson Road in Santa Clara County, California. The proposed improvements are designed to reduce cross traffic accidents at this intersection. The current intersection does not provide a left turn pocket for drivers traveling west on SR 152 where it intersects with Ferguson Road. In addition, drivers traveling south on Ferguson Road must come to a complete stop before merging with SR 152 traffic. These factors have contributed to numerous accidents at the intersection, as a result of either cross-traffic accidents or head-on collisions. The proposed left turn pocket will improve conditions by allowing drivers traveling on either Ferguson Road or SR 152 a safe route to enter and exit either roadway.

The project area lies along SR 152, about 3 miles southeast of the City of Gilroy, at the point at which SR 152 west turns west to continue towards U.S. Highway (U.S.) 101, which is about 3 miles to the west. SR 152 intersects with the southern terminus of Ferguson Road at almost a 90-degree angle at this turn. Within the limits of this project area, SR 152 is a two-lane undivided

conventional highway, running east/west between post mile (PM) 12.62 and PM 13.04, featuring 12-foot lanes and outside shoulders that vary between 0 and 8 feet (ft) wide. Beyond the project area, SR 152 is an inter-regional, recreational, commercial, agricultural, and commuter route that serves as a major truck route connecting U.S. 101 with Interstate 5.

Project Description

A traffic safety improvement project proposes to realign and signalize the Route 152/Ferguson Road intersection, in Santa Clara County, near the City of Gilroy (PM 12.81). The proposed structural sections would accommodate a standard-width through lane and left-turn lane with storage on eastbound SR 152, a standard-width through lane and right-turn only lane on southbound Ferguson Road, a standard-width through lane on northbound Ferguson Road, and standard-width outside shoulders throughout the project area. Because an existing substandard radius curve would be perpetuated, lanes wider than standard would be constructed through this curve to accommodate the movement of traffic. In addition, the existing roadway would be resurfaced with hot mix asphalt.

The existing roadway is a two-lane undivided conventional highway, running east/west. The existing structural section has approximately 12-ft wide lanes with outside shoulders that vary in width between 0 ft and 8 ft. The new structural sections are planned as follows:

Westbound and Eastbound STA 668+25 to STA 676+40, Route 152:

The new pavement structural section would be constructed to accommodate 12- to 16-ft lanes and 8 ft shoulders. The edge of pavement would be offset 20 ft from the center line at STA 666+34, and it would vary between 24 ft at STA 676+40 on the left side and 40 ft on right side of SR 152. The width of this new structural section would vary from 8 ft to 28 ft throughout its length. As per updated material recommendations the depth of structural section would be 2.35 ft from the top of existing surface of the roadway.

Westbound & Eastbound STA 676+40 to STA 683+00, Route 152:

The new pavement structural section would be constructed to accommodate 16-ft through lanes, a 16-ft left turn lane on eastbound, a 16-foot right turn lane on westbound and 8-ft wide outside shoulders. The edge of the pavement would vary from 24 ft to 54 ft, offset from the centerline on westbound side, and 40 ft to 38 ft on eastbound side. The depth of this structural section would be 2.35 ft from the existing surface of the roadway.

Westbound & Eastbound STA 683+00 to STA 688+00, Rte 152:

The new pavement structural section would be constructed to accommodate 12- to 16-ft through lanes, a 12- to 16-ft right turn lane on westbound, and 8-ft wide outside shoulders. The edge of the pavement would vary from 40 ft to 20 ft offset from the centerline on both sides of SR152. The depth of this structural section would be 2.35 ft from the existing surface of the roadway.

Northbound & Southbound STA 100+00 to STA 103+82, Ferguson Rd:

The new pavement structural section would be constructed to accommodate a 12-ft left-turn lane with storage, a 12-foot right-turn lane on southbound Ferguson Road, a 12-ft through lane on northbound Ferguson Road, and 8-ft wide outside shoulders. The edge of pavement would vary from 20 ft to 86 ft offset from the centerline on southbound side and 20 ft to 76 ft offset from the centerline on northbound side. The depth of this structural section would be 2.35 ft from the existing surface of the roadway.

The proposed roadway changes would also require modifications to the drainage system associated with this portion of SR 152. The following changes are planned:

- A 192-inch (in) wide and 24-in deep (16 ft x 2 ft) side storage ditch would be placed on eastbound side from STA 668+25 to STA 688+00. Berms would be placed at STA 671+00, STA 674+00, STA 682+00, STA 685+00, and STA 686+00.
- A 192-in wide and 24-in deep side storage ditch would be placed on westbound side from STA 668+25 to STA 677+50. Berms will be placed at STA 671+00 and STA 674+00.
- A 192-in wide and 24-in deep side storage ditch would be placed on westbound side from STA 681+60 to STA 688+00. Berms will be placed at STA 682+00, STA 685+00, and STA 686+00.
- Maintain same size side ditch of 4 ft wide and 4 ft deep for east of Ferguson Road with 4:1 side slope.
- A 30-in reinforced concrete pipe (RCP) would be placed, 54-in deep at Ferguson Road at STA 100+65.
- At STA 102+38, existing 18-in drainage pipe on west of Ferguson Road would be extended by 15 ft.
- An 18-in RCP would be placed from STA 671+38 to STA 672+16. The depth of pipe should match the elevation of the side ditch.
- A drainage basin-1 (24,686 ft^2 in area, 4 ft deep) would be placed in between north of SR 152 and west of Ferguson Road.
- A drainage basin-2 (12,927 ft^2 in area, 4 ft deep) would be placed in between north of SR 152 and east of Ferguson Road.

The existing Right-of-Way limits in the project area are 33 ft from the centerline on both side of SR 152, 30 ft from the centerline on the east side and 90 ft on the west side of Ferguson Road. The proposed Right-of-Way limits are 60 ft from centerline on both sides of SR 152 and 56 ft from the centerline on east of Ferguson Road. Project designs call for utilities to be moved, but the exact location will be determined during plans, specifications, and estimates phase by the utility companies.

Construction Schedule
The project is expected to require an estimated 90 working days (4.5 months). The Contract Construction Acceptance is scheduled for February 1, 2012 and work is scheduled to be completed by October 15.

Construction Activities
All equipment staging and lay down will occur within the proposed BSA. Roadway work will be completed first followed by construction of the detention basins. During roadway construction, detention basins area will be used as a part of equipment staging area. During detention basin construction, roadway edges or other construction areas would be used as storage.

PROPOSED CONSERVATION MEASURES

To ensure that project work avoids and minimizes effects to these federally protected species and their marginal habitat within the action area, the following general conservation measures would be implemented:

1. A USFWS-approved biological monitor knowledgeable about sensitive species and habitats in the action area and vicinity will be present at all times during project pre-construction, construction, and clean up activities.

2. Disturbance to existing vegetation would be limited to the action area. Placement of all staging areas and other facilities would avoid and limit disturbance to habitat for federally protected species to the maximum extent practicable. Existing ingress and egress points would be used and staging and material storage areas confined to designated areas.

3. Project proponents would exercise Best Management Practices (BMPs) to protect individuals of these species and their habitat(s) from pollution due to fuels, oils, lubricants, and other harmful materials. Vehicles and equipment that are used during the course of a project would be fueled and serviced in a "safe" area (i.e., outside of sensitive habitats) in a manner that would not affect federally protected species in the action area or their habitats. Spills, leaks, and other problems of a similar nature would be resolved immediately to prevent unnecessary effects. A plan for the emergency clean up of any spills of fuel or other material would be available on site and adequate materials for spill cleanup would be maintained on site.

4. Project proponents would exercise every reasonable precaution to protect these species and their habitat(s) from construction by-products and pollutants such as construction chemicals, fresh cement, saw-water, or other deleterious materials. Water containing mud, silt, concrete, etc. from construction activities would be treated by filtration, retention in a settling pond, etc. Fresh cement or concrete would not be allowed to enter flowing water of streams. Construction pollutants would be collected and transported to an authorized disposal area, as appropriate, and per all federal, state, and local laws and regulations.

5. All hazardous material would be stored in properly designated containers in a storage area with an impermeable membrane between the ground and the hazardous material. The storage area would be encircled by a berm to prevent the discharge of pollutants to ground water or runoff into federally listed species habitats. A plan for the emergency clean up of any hazardous material would be available on site and adequate materials for spill cleanup would be maintained on site.

6. All construction material, wastes, debris, sediment, rubbish, vegetation, trash, fencing, etc. would be removed from the site once the project is completed and transported to an authorized disposal area, as appropriate, and per all federal, state, and local laws and regulations.

7. Standard BMPs and erosion control measures would be implemented during construction to minimize possible discharge of sediment into aquatic habitats. These measures include, but are not limited to, installing and maintaining silt fences immediately down gradient from disturbed areas and installing and maintaining erosion control blankets on all disturbed ground. Erosion control materials that could trap or harm listed amphibians or reptiles would not be used.

8. Project proponents would ensure that sediment-control devices are installed and maintained correctly. For example, sediment would be removed from sediment controls once the sediment has reached one-third of the exposed height of the control. The devices would be inspected frequently (e.g., daily) to ensure they are functioning properly; controls would be immediately repaired or replaced or additional controls would be installed as necessary. Sediment that is captured in these controls may be disposed of on site in an appropriate, safe, approved area, or off site at an approved disposal site.

California Red-Legged Frog Protective Measures

While construction activities would occur in the channelized waters (roadside drainage ditches) in the action area, implementing the following specific conservation measures described in conjunction with the general conservation measures described above would ensure that the project avoids and/or minimizes potential negative effects to California red-legged frog populations and habitat within the action area.

9. Construction activities would be timed to occur during the dry season (non-breeding season for California red-legged frogs) (April 15 to October 15) to minimize take of dispersing frogs.

10. Prior to construction, a qualified biologist would conduct training sessions to familiarize all construction personnel with the following: identification of California red-legged frogs, their habitat, general provisions and protections afforded by the federal Endangered Species Act, measures implemented to protect the species, and a review of project boundaries.

11. A qualified USFWS-approved biologist (biologist) would conduct pre-construction surveys of all ground disturbance areas within riparian habitats to determine if California red-legged frogs are present before construction begins. These surveys would be conducted immediately prior (within 30 minutes) to construction-related activities, including equipment or material staging, vegetation removal, grading, and other ground-disturbing activities. If California red-legged frogs are found during any preconstruction surveys, the biologist would contact the USFWS to determine if moving them is appropriate. If the USFWS gives approval for relocation, a USFWS-approved biologist with a 10(a)(1)(A) permit would be allowed sufficient time to move the California red-legged frog(s) from the work site before activities begin.

12. Any California red-legged frogs detected in or near the project area during construction activities will be captured and transported immediately in a cool, moist container to a suitable location outside of the project area, based on the professional judgment of a Service-approved biologist authorized to monitor the project. This relocation site will be determined in advance by a qualified biologist in consultation with the USFWS. The relocated individual(s) will be monitored until it is determined that the animal(s) are not imperiled by predators or other dangers. If the biologist finds that moving the animal would cause unnecessary stress, and if construction activities would NOT result in mortality, harm, or harassment, the biologist may decide not to relocate the animal. In such case, the Service-approved biologist would inform the Service and remain on site during construction activities to ensure project activities do not result in mortality, harm or harassment to the individual(s).

13. Exclusion fences composed of silt fence material would be installed at the margins of the work area to prevent workers from encroaching into adjacent habitat and to prevent California red-legged frogs from entering the construction area. A fine mesh would be used to avoid entrapment of amphibians in the silt fence. The silt fence would be monitored periodically during construction to evaluate its effectiveness. All fencing in this area would be maintained for the duration of construction and removed upon project completion.

14. To avoid attracting predators, food-related trash would be kept in closed containers and removed daily from the action area.

San Joaquin Kit Fox Protective Measures

Implementing the following conservation measures in conjunction with the general conservation measures described above will ensure that the project avoids and/or minimizes potential negative effects to San Joaquin kit fox populations and habitat within the action area.

15. Preconstruction den surveys: Preconstruction surveys within the action area will be conducted no more than 14 days before construction begins, in accordance with the most current protocols approved by the USFWS and CDFG.

16. Procedure for preconstruction onsite den discovery: If potential dens are located, or a San Joaquin kit fox is found, the following measures will be implemented to minimize the project-related disturbance to San Joaquin kit fox and its habitat:

    a. Infrared camera stations will be set up and maintained for three consecutive days at den openings prior to initiation of construction to determine the status of the potential dens.

    b. If a den is unoccupied and can be avoided during construction, it will be left intact and monitored during construction. If a den is unoccupied and cannot be avoided during construction, it will be destroyed according to guidelines provided by the USFWS and CDFG.

    c. If a San Joaquin kit fox is found using a den site within 300 ft of the construction site, the USFWS and CDFG will be notified at once for further guidance.

17. Procedure for onsite discovery of San Joaquin kit fox during construction: If a San Joaquin kit fox, or any animal that construction personnel believe may be a San Joaquin kit fox, is encountered during project construction, or if any contractor, employee, or agency personnel inadvertently kills or injures a San Joaquin kit fox, the following protocol shall be observed:

    a. All work that could result in direct injury, disturbance, or harassment of the individual animal will immediately cease.

    b. The resident engineer will be immediately notified.

    c. The resident engineer will notify the approved onsite biologist.

    d. The animal will be allowed to leave the site voluntarily. The biologist will contact the USFWS and CDFG within 24 hours.

    e. If a San Joaquin kit fox has been killed or injured, the biologist will contact the USFWS and CDFG within 24 hours.

18. Entrapment avoidance: To prevent inadvertent entrapment of San Joaquin kit fox or other animals during construction, all excavated, steep-walled holes or trenches more than 2 ft deep will be covered with plywood or similar materials at the end of each working day. Holes or trenches will have one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If, at any time, a trapped San Joaquin kit fox (or other listed wildlife) is discovered, USFWS and CDFG will be contacted.

19. Capping/Inspection of pipes: Because San Joaquin kit fox are attracted to den-like structures such as pipes and may enter stored pipes and become trapped, all construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored at a construction site for one or more overnight periods will be either securely capped prior to storage or thoroughly inspected for San Joaquin kit fox before the pipe is

subsequently buried, capped, or otherwise used or moved in any way. Any San Joaquin kit fox found in a pipe or culvert shall be allowed to escape unimpeded.

20. Contractor Training: Before any construction activities begin on the project, a Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the San Joaquin kit fox and its habitat, the importance of the species and its habitat, the general measures that are being implemented to conserve these species as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

21. Timing Restrictions: To the extent possible, construction activities should cease one half hour before sunset and should not begin prior to a half hour before sunrise. Construction crews would be informed during the training session meeting that, to the extent possible, travel within the project site would be restricted to established roadbeds. Established roadbeds include all pre-existing and project-constructed unimproved, as well as improved roads.

22. Restrictions: Caltrans employees, contractors and contractors' employees will not have firearms on the project site. This will not apply to authorized security personnel, or local, State, or Federal law enforcement officials.

Compensation Measures

Listed species affected by the proposed project are the California red-legged frog, California tiger salamander, and San Joaquin kit fox. Based on the best available science for occurrences and with the implementation of avoidance and minimization measures, Caltrans has determined that the proposed project is 'likely to adversely affect' the California red-legged frog and California tiger salamander, and 'may effect, but is not likely to adversely effect' the San Joaquin kit fox. Compensation will be performed for permanent and temporary impacts to habitat by the project in accordance with FHWA policies on habitat loss. Temporary impacts to habitat will be compensated at a 1.1:1 mitigation ratio, while permanent impacts to habitat shall be compensated at 3:1. Table 1 summarizes the expected permanent and temporary habitat loss within the project area due to construction activities.

Table 1: Permanent and Temporary Project Impacts and Mitigation Requirements

Species	Impacts						Restoration/Creation		Total Mitigation Need (acres)**
	Temporary (acres)*			Permanent (acres)			Restored Temporary Impacts*	Created Habitat (acres)	
	Impact	Mitigation Ratio	Mitigation Need	Impact	Mitigation Ratio	Mitigation Need			
California red-legged frog	1.05	1.1:1	1.16	3.17	3:1	9.51	1.05	1.19	8.43
California tiger salamander	1.05	1.1:1	1.16	3.17	3:1	9.51	1.05	1.19	8.43

* Temporary impacts would be fully restored to pre-project conditions.
**The total mitigation need is calculated as the sum of the mitigation required as a result of temporary and permanent impacts minus the sum of acres of restored temporary impact areas and created habitat (detention basin wetlands for California red-legged frog).

Compensation for the effects to the California red-legged frog and California tiger salamander would be provided at the proposed Caltrans compensation site on SR-152, across from Bell's Station, or at another acceptable location within Santa Clara County. Compensation would be

met through the purchase of conservation bank credits, contribution to the purchase of habitat acquisition, contribution to an in lieu fee program that complies with FHWA policy for Federal aid participation, or a combination of the above-noted options. Compensation may be co-located in shared habitat for the California red-legged frog and California tiger salamander.

ACTION AREA

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the Service considers the action area to encompass the project footprint, equipment staging areas, Caltrans Right-of-Way (ROW) limits, construction easements, and adjacent lands that will be subjected to noise, light, and vibration disturbance. The action area comprises an area of 8.05 acres and extends 30 ft beyond the edge of pavement of SR 152 and Ferguson Road.

STATUS, ENVIRONMENTAL BASELINE AND EFFECTS

California Red-legged Frog

STATUS AND NATURAL HISTORY

Listing Status: The California red-legged frog was listed as a threatened species on May 23, 1996 (USFWS 1996). Critical Habitat was designated for this species on April 13, 2006 (USFWS 2006). A recovery plan was published for the California red-legged frog on September 12, 2002 (USFWS 2002). The action area is not within critical habitat, but is located within the Diablo Range and Salinas Valley Recovery Unit, East San Francisco Bay Core Area, and the Pacheco-Santa Ana Creek Hydrologic Sub-Area (USFWS 2002, 2006).

Description: The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches (3.81 to 12.95 centimeters) in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches (1.52 to 7.87 centimeters) in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Distribution: The historic range of the red-legged frog extended coastally from the vicinity of Elk Creek in Mendocino County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The red-legged frog was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (USFWS 2002). Red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the central coast. Within the remaining distribution of the species, only isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFG 2004).

Status and Natural History: California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 1,500 meters in elevation (Jennings and Hayes 1994, Bulger et al. 2003, Stebbins 2003). However, red-legged frogs also have been found in

ephemeral creeks and drainages and in ponds that may or may not have riparian vegetation. California red-legged frogs breed between November and April in still or slow-moving water at least 2½ feet (0.7 meters) in depth with emergent vegetation, such as cattails (*Typha* spp.), tules (*Scirpus* spp.) or overhanging willows (*Salix* spp.) (Hayes and Jennings 1988). Red-legged frogs have paired vocal sacs and vocalize in air (Hayes and Krempels 1986). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto 1984). Red-legged frogs breed from November through March with earlier breeding records occurring in southern localities (Storer 1925). Individuals occurring in coastal drainages are active year-round (Jennings et al. 1992), whereas those found in interior sites are normally less active during the cold season.

During other parts of the year, habitat includes nearly any area within 1-2 miles (1.6-3.2 kilometers) of a breeding site that stays moist and cool through the summer (Fellers 2005). According to Fellers (2005), this can include vegetated areas with coyote bush (*Baccharis pilularis*), California blackberry thickets (*Rubus ursinus*), and root masses associated with willow (*Salix species*) and California bay (*Umbellularis californica*) trees. Sometimes the non-breeding habitat used by red-legged frogs is extremely limited in size. For example, non-breeding red-legged frogs have been found in a 6-foot (1.8-meter) wide coyote bush thicket growing along a tiny intermittent creek surrounded by heavily grazed grassland (Fellers 2005). Sheltering habitat for red-legged frogs is potentially all aquatic, riparian, and upland areas within the range of the species and includes any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches (45.7 centimeters) also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adult frogs are often associated with permanent bodies of water. Some frogs remain at breeding sites all year while others disperse. Dispersal distances are typically less than 0.5 mile (0.8 kilometers), with a few individuals moving up to 1-2 miles (1.6-3.2 kilometers) (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger et al. (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger reported that non-migrating frogs typically stayed within 200 feet (60 meters) of aquatic habitat 90% of the time and were most often associated with dense vegetative cover, i.e. California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25 miles (0.4 kilometers) to more than 2 miles (3.2 kilometers) without apparent regard to topography, vegetation type, or riparian corridors (Bulger et al. 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment, Tatarian (2008) noted that a 57% majority of frogs fitted with radio transmitters in the Round Valley study area in eastern Contra Costa County stayed at their breeding pools, whereas 43% moved into adjacent upland habitat or to other aquatic sites. This study reported a peak of seasonal terrestrial movement occurring in the fall months, with movement commencing with the first 0.2 inches (0.5 cm) of precipitation. Movements away from the source pools tapered off into spring.

Upland movement activities ranged from 3 to 233 feet (1 to 71 m), averaging 80 feet (24.38 m), and were associated with a variety of refugia including ground squirrel burrows at the bases of trees or rocks, logs, grass thatch, crevices, cow hoof prints, and a downed barn door; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Uplands closer to aquatic sites were used more often and frog refugia were more commonly associated with areas exhibiting higher object cover, e.g. woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between frog occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to 14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings et al. 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand results in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3½ to 7 months following hatching and reach sexual maturity 2 to 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings et al. 1992). Sexual maturity normally is reached at 3 to 4 years of age (Storer 1925; Jennings and Hayes 1985). Red-legged frogs may live 8 to 10 years (Jennings et al. 1992). Populations of red-legged frogs fluctuate from year to year. When conditions are favorable red-legged frogs can experience extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, red-legged frogs may temporarily disappear from an area when conditions are stressful (e.g., drought).

The diet of red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food items. According to their data, vertebrates, such as Pacific tree frogs and California mice (*Peromyscus californicus*); represent over half the prey mass eaten by larger frogs (Hayes and Tennant 1985). Hayes and Tennant (1985) found juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. Feeding activity probably occurs along the shoreline and on the surface of the water (Hayes and Tennant 1985). The diet of red-legged frogs is not well studied, but their diet probably is similar to other ranid frogs that feed on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b).

Threats: Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish (*Procambarus clarkii*), signal crayfish (*Pacifastacus leniusculus*), and several species of warm water fish including sunfish (*Lepomis* spp.), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and mosquitofish (*Gambusia affinis*) (L. Hunt, in litt. 1993; S. Barry, in litt. 1992; S. Sweet, in litt. 1993). Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the red-legged frog throughout its range.

Several researchers in central California have noted the decline and eventual disappearance of red-legged frog populations once bullfrogs became established at the same site (L. Hunt, in litt. 1993; S. Barry, in litt. 1992; S. Sweet, in litt. 1993). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs (*Rana aurora aurora*), and suggested that bullfrogs could prey on subadult northern red-legged frogs as well. Bullfrogs may also have a competitive advantage

over red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Further more, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with red-legged frog reproduction. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; M. Jennings, in litt.1993; R. Stebbins in litt. 1993). Thus bullfrogs are able to prey upon and out-compete red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to red-legged frog habitat has also impacted red-legged frogs. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks red-legged frog dispersal, and the introduction of predatory fishes and bullfrogs. This report further identifies the conversion and isolation of perennial pool habitats resulting from urbanization as an ongoing impact to red-legged frogs. Mao et al. (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric three-spined sticklebacks (*Gasterosteus aculeatus*) in northwestern California. Ingles (1932a, 1932b, and 1933 cited in Fellers 2005) reported four species of trematodes from red-legged frogs, but he later synonymized two of them (found them to be the same as the other two).

The recovery plan for red-legged frogs identifies eight Recovery Units (USFWS 2002). The establishment of these Recovery Units is based on the Recovery Team's determination that various regional areas of the species' range are essential to its survival and recovery. The status of the red-legged frog will be considered within the smaller scale of Recovery Units as opposed to the overall range. These Recovery Units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog. The goal of the draft recovery plan is to protect the long-term viability of all extant populations within each Recovery Unit. Within each Recovery Unit, core areas have been delineated and represent contiguous areas of moderate to high red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy will allow for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of red-legged frogs.

ENVIRONMENTAL BASELINE

The action area is not located within designated critical habitat; however, Henry Coe State Park (Unit STC-1B) critical habitat unit is located approximately 4.8 miles to the northwest (USFWS 2006). The action area is located within the Diablo Range and Salinas Valley Recovery (Unit 6) and lies 1.9 miles northwest of the Santa Clara Valley Core Area (#17) and 5.2 miles southwest of the East San Francisco Bay Core Area (#16) (USFWS 2002). The conservation needs for the Santa Clara Valley and East San Francisco Bay core areas are: (1) protect existing populations; (2) study the effects of grazing on habitat; (3) reduce grazing impacts; (4) protect habitat connectivity; (5) minimize impacts from off-road travel and other recreational activities; (6) reduce impacts of urban development; and (7) protect habitat buffers from nearby urbanization.

According to the Biological Assessment, the project is located within the known range of the California red-legged frog, and the action area contains some areas suitable for migration and dispersal of this species, although no suitable California red-legged frog breeding habitats are located within the action area. A total of nine occurrences have been reported within five miles of the project footprint in the Coyote Lake watershed to the northeast (Occ. # 466, 689 and 747) and the foothills and tributaries to the Pajaro River to the south (Occ. # 232) and southwest (Occ.

213-215) comprising all life stages (CDFG 2008). Three potential breeding ponds are present within the foothills between 1.2 and 1.6 miles to the northeast and the numerous creeks within the project vicinity including Jones, Dexter, San Ysidro, and Llagas creeks may support breeding and non-breeding aquatic habitat.

Jones Creek located approximately 50 feet southwest of the project footprint is characterized by slow moving water, aquatic vegetation, and occasional pools, which is unlikely to support breeding; although, it is suitable non-breeding aquatic habitat. The nearest potential breeding habitat consists of an artificial stock pond on private property about 400 feet east of the project footprint. However, based on the biological assessment it is stocked with common carp (*Cyprinus carpio*) and striped bass (*Morone saxatilis*). Property owner Michael Gilroy informed Caltrans that no frogs or tadpoles have been seen in the pond, which is regularly used for fishing (Gilroy 2008 in Caltrans 2008). The channelized canals, i.e. roadside drainage ditches, provide seasonally suitable non-breeding aquatic habitat, which may support dispersal, foraging, refugia activities.

The Service concurs that the action area does not provide suitable breeding habitat for California red-legged frogs based on the shallow depth and sparse pools in Jones Creek, presence of predatory striped bass and common carp within the adjacent stock pond, and minimal ponding within the channelized drainage canals along SR 152. However, the Service has determined that the action area does provide suitable non-breeding aquatic, foraging, refugia and dispersal habitat within Jones Creek, channelized canals, and adjacent uplands. Based on the prevalence of California red-legged frogs within the project vicinity, connectivity to adjacent occupied habitats, and the presence of suitable habitat within and adjacent to the action area, the Service has determined there is a reasonable potential for California red-legged frogs to inhabit or disperse through the action area.

California Tiger Salamander

STATUS AND NATURAL HISTORY

Listing Status: The final rule listing the Central Valley population of the California tiger salamander as a threatened species was published on August 4, 2004 (USFWS 2004a). Critical habitat was designated on August 23, 2005 in 19 counties for the Central Valley population (USFWS 2005).

Description: The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Recorded adult measurements have been as much as 8.2 inches (20.8 centimeters) long (Petranka 1998; Stebbins 2003). Tiger salamanders exhibit sexual dimorphism (differences in body appearance based on gender) with males tending to be larger than females. Tiger salamander coloration generally consists of random white or yellowish markings against a black body. The markings on adults California tiger salamanders tend to be more concentrated on the lateral sides of the body, whereas other tiger salamander species tend to have brighter yellow spotting that is heaviest on the dorsal surface.

Distribution: The California tiger salamander is endemic to California and historically inhabited the low-elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and Inner Coast Ranges (Jennings and Hayes 1994; Storer 1925; Shaffer et al. 1993). The species has been recorded from near sea level to approximately 3,900 feet (1,189 meters) in the Coast Ranges and to approximately 1,600 feet (488 meters) in the Sierra Nevada foothills (Shaffer et al. 2004). Along the Coast Ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County. Three distinct California

tiger salamander populations are recognized and correspond to Santa Maria area within Santa Barbara County, the Santa Rosa Plain in Sonoma County, and vernal pool/grassland habitats throughout the Central Valley.

Status and Natural History: The tiger salamander has an obligate biphasic life cycle (Shaffer et al. 2004). Although the larvae develop in the vernal pools and ponds in which they were born, tiger salamanders are otherwise terrestrial and spend most of their post-metamorphic lives in widely dispersed underground retreats (Shaffer et al. 2004; Trenham et al. 2001). Because they spend most of their lives underground, tiger salamanders are rarely encountered even in areas where salamanders are abundant. Subadult and adult tiger salamanders typically spend the dry summer and fall months in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a). Although ground squirrels have been known to eat tiger salamanders, the relationship with their burrowing hosts is primarily commensal (an association that benefits one member while the other is not affected) (Loredo et al. 1996; Semonsen 1998).

Tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for tiger salamanders. Underground refugia also provide protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although California tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. Tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia for the species. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredo et al. 1996).

Upland burrows inhabited by tiger salamanders have often been referred to as aestivation sites. However, "aestivation" implies a state of inactivity, while most evidence suggests that tiger salamanders remain active in their underground dwellings. A recent study has found that tiger salamanders move, feed, and remain active in their burrows (Van Hattem 2004). Because tiger salamanders arrive at breeding ponds in good condition and are heavier when entering the pond than when leaving, researchers have long inferred that tiger salamanders are feeding while underground. Recent direct observations have confirmed this (Trenham 2001; Van Hattem 2004). Thus, "upland habitat" is a more accurate description of the terrestrial areas used by tiger salamanders.

Tiger salamanders typically emerge from their underground refugia at night during the fall or winter rainy season (November-May) to migrate to their breeding ponds (Stebbins 1985, 1989; Shaffer et al. 1993; Trenham et al. 2000). The breeding period is closely associated with the rainfall patterns in any given year with less adults migrating and breeding in drought years (Loredo and Van Vuren 1996; Trenham et al. 2000). Male salamander are typically first to arrive and generally remain in the ponds longer than females. Results from a 7-year study in Monterey County suggested that males remained in the breeding ponds for an average of 44.7 days while females remained for an average of only 11.8 days (Trenham et al. 2000). Historically, breeding ponds were likely limited to vernal pools, but now include livestock stockponds. Ideal breeding ponds are typically fishless, and seasonal or semi-permanent (Barry and Shaffer 1994; Petranka 1998).

While in the ponds, adult salamanders mate and then the females lay their eggs in the water (Twitty 1941; Shaffer et al. 1993; Petranka 1998). Egg laying typically reaches a peak in January (Loredo and Van Vuren 1996; Trenham et al. 2000). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). Eggs are often attached to objects, such as rocks and boards in ponds with no or

limited vegetation (Jennings and Hayes 1994). Clutch sizes from a Monterey County study had an averaged of 814 eggs (Trenham et al. 2000). Seasonal pools may not exhibit sufficient depth, persistence, or other necessary parameters for adult breeding during times of drought (Barry and Shaffer 1994). After breeding and egg laying is complete, adults leave the pool and return to their upland refugia (Loredo et al. 1996; Trenham 1998a). Adult salamanders often continue to emerge nightly for approximately the next two weeks to feed amongst their upland habitat (Shaffer et al. 1993).

Tiger salamander larvae typically hatch within 10 to 24 days after eggs are laid (Storer 1925). The peak emergence of these metamorphs is typically between mid-June and mid-July (Loredo and Van Vuren 1996; Trenham et al. 2000). The larvae are totally aquatic and range in length from approximately 0.45 to 0.56 inches (1.14 to 1.42 centimeters) (Petranka 1998). They have yellowish gray bodies, broad fat heads, large, feathery external gills, and broad dorsal fins that extend well up their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume the tadpoles of Pacific treefrogs (*Hyla regilla*), western spadefoot toads (*Spea hammondii*), and California red-legged frogs (J. Anderson 1968; P. Anderson 1968; University of California 2005). Tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems. When not feeding, they often rest on the bottom in shallow water but are also found throughout the water column in deeper water. Young salamanders are wary and typically escape into vegetation at the bottom of the pool when approached by potential predators (Storer 1925).

The tiger salamander larval stage is typically completed in 3 to 6 months with most metamorphs entering upland habitat during the summer (Petranka 1998). In order to be successful, the aquatic phase of this species' life history must correspond with the persistence of its seasonal aquatic habitat. Most seasonal ponds and pools dry up completely during the summer. Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973).

Larval development and metamorphosis can vary and is often site-dependent. Larvae collected near Stockton in the Central Valley during April varied between 1.88 to 2.32 inches (4.78 to 5.89 centimeters) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left breeding pools 60 to 94 days after eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. Longer ponding duration typically results in larger larvae and metamorphosed juveniles that are more likely to survive and reproduce (Pechmann et al. 1989; Semlitsch et al. 1988; Morey 1998; Trenham 1998b). Larvae will perish if a breeding pond dries before metamorphosis is complete (P. Anderson 1968; Feaver 1971). Pechmann et al. (1988) found a strong positive correlation between ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 sampled pools supported larval California tiger salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only 6 (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch et al. 1988; Scott 1994; Morey 1998).

Following metamorphosis, juveniles leave their pools and enter upland habitat. This emigration can occur in both wet and dry conditions (Loredo and Van Vuren 1996; Loredo et al. 1996). Wet conditions are more favorable for upland travel but rare summer rain events seldom occur as metamorphosis is completed and ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under dry conditions, juveniles may be limited to seeking upland refugia in close proximity to their aquatic larval pool. These individuals often wait until

the next winter's rains to move further into more suitable upland refugia. Although likely rare, larvae may over-summer in permanent ponds (**University of California 2005**). Juveniles remain active in their upland habitat, emerging from underground refugia during rainfall events to disperse or forage (Trenham and Shaffer 2005). Depending on location and other development factors, metamorphs will not return as adults to aquatic breeding habitat for 2 to 5 years (Loredo and Van Vuren 1996; Trenham et al. 2000).

Lifetime reproductive success for tiger salamander species is low. Results from one study suggest that the average female tiger salamander bred 1.4 times and produced 8.5 young per reproductive effort that survived to metamorphosis (Trenham et al.2000). This resulted in the output of roughly 11 metamorphic offspring over a breeding female's lifetime. The primary reason for low reproductive success may be that this relatively short-lived species requires two or more years to become sexually mature (Shaffer et al. 1993). Some individuals may not breed until they are four to six years old. While California tiger salamanders may survive for more than ten years, many breed only once, and in one study, less than 5 percent of marked juveniles survived to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well human-caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Dispersal and migration movements made by tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/ birth pond to breed, while 20 percent dispersed to other ponds (Trenham et al. 2001). After breeding, adult tiger salamanders return to upland habitats, where they may live for one or more years before attempting to breed again (Trenham et al. 2000).

Tiger salamanders are known to travel large distances between breeding ponds and their upland refugia. Generally it is difficult to establish the maximum distances traveled by any species, but tiger salamanders in Santa Barbara County have been recorded dispersing up to 1.3 miles (2.1 kilometers) from their breeding ponds (Sweet in litt. 1998). Tiger salamanders are also known to travel between breeding ponds. One study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at other ponds approximately 1,900 and 2,200 feet (579 to 671 meters) away (Trenham et al. 2001). In addition to traveling long distances during juvenile dispersal and adult migration, tiger salamanders may reside in burrows far from their associated breeding ponds.

Although previously sited information indicates that tiger salamanders can travel long distances, they typically remain close to their associated breeding ponds. A trapping study conducted in Solano County during the winter of 2002/2003 suggested that juveniles dispersed and used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More juvenile salamanders were captured at traps placed at 328, 656, and 1,312 feet (100, 200, and 400 meters) from a breeding pond than at 164 feet (50 meters). Approximately 20 percent of the captured juveniles were found at least 1,312 feet (400 meters) from the nearest breeding pond. The associated distribution curve suggested that 95 percent of juvenile salamanders were within 2,099 feet (640 meters) of the pond, with the remaining 5 percent being found at even greater distances. Preliminary results from the 2003-04 trapping efforts at the same study site detected juvenile tiger salamanders at even further distances, with a large proportion of the captures at 2,297 feet (700 meters) from the breeding pond (Trenham et al., unpublished data). Surprisingly, most juveniles captured, even those at 2,100 feet (640 meters), were still moving away from

ponds (Ben Fitzpatrick, University of California at Davis, personal communication, 2004). In Santa Barbara County, juvenile California tiger salamanders have been trapped approximately 1,200 feet (366 meters) away while dispersing from their natal pond (Science Applications International Corporation, unpublished data). These data show that many California tiger salamanders travel far while still in the juvenile stage. Post-breeding movements away from breeding ponds by adults appear to be much smaller. During post-breeding emigration from aquatic habitat, radio-equipped adult tiger salamanders were tracked to burrows between 62 to 813 feet (19 to 248 meters) from their breeding ponds (Trenham 2001). These reduced movements may be due to adult California tiger salamanders exiting the ponds with depleted physical reserves, or drier weather conditions typically associated with the post-breeding upland migration period.

California tiger salamanders are also known to use several successive burrows at increasing distances from an associated breeding pond. Although previously sited studies provide information regarding linear movement from breeding ponds, upland habitat features appear to have some influence on movement. Trenham (2001) found that radio-tracked adults were more abundant in grasslands with scattered large oaks (*Quercus* spp.), than in more densely wooded areas. Based on radio-tracked adults, there is no indication that certain habitat types are favored as terrestrial movement corridors (Trenham 2001). In addition, captures of arriving adults and dispersing new metamorphs were evenly distributed around two ponds completely encircled by drift fences and pitfall traps. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Documented or potential tiger salamanders predators include coyotes (*Canis latrans*), raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), opossums (*Didelphis virginiana*), egrets (*Egretta species*), great blue herons (*Ardea herodias*), crows (*Corvus brachyrhynchos*), ravens (*Corvus corax*), garter snakes (*Thamnophis species*), bullfrogs (*Rana catesbeiana*), California red-legged frogs, mosquito fish (*Gambusia affinis*), and crayfish (*Procrambus species*). Domestic dogs have been observed eating California tiger salamanders at Lake Lagunitas at Stanford University (Sean Barry, ENTRIX, personal communication to C. Nagano, July 2004).

The California tiger salamander is imperiled throughout its range due to a variety of human activities (USFWS 2004). Current factors associated with declining tiger salamander populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the non-native eastern tiger salamander (*Ambystoma tigrinum*) (Fitzpatrick and Shaffer 2004; Riley et al. 2003); and predation by introduced species. California tiger salamander populations are likely threatened by multiple factors but continued habitat fragmentation and colonization of non-native salamanders may represent the most significant current threats. Habitat isolation and fragmentation within many watersheds have precluded dispersal between sub-populations and jeopardized the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or "rescuing" extinct habitat patches). Other threats include predation and competition from introduced exotic species; possible commercial over-utilization; diseases; various chemical contaminants; road kill; and certain unrestrictive mosquito and rodent control operations. Currently, these various primary and secondary threats are largely not being offset by existing federal, state, or local regulatory mechanisms. The tiger salamander is also prone to chance environmental or demographic events, to which small populations are particularly vulnerable.

Thirty-one percent (221 of 711 records and occurrences) of all Central California tiger salamander records and occurrences are in Alameda, Santa Clara, San Benito (excluding the extreme western end of the County), southwestern San Joaquin, western Stanislaus, western Merced, and southeastern San Mateo counties. Of these counties, most of the records are from

eastern Alameda and Santa Clara counties (Buckingham in litt. 2003; CDFG 2008; USFWS 2004b). The California Department of Fish and Game (2008) now considers 13 of these records from the Bay Area region as extirpated or likely to be extirpated.

The East Bay and Livermore Valley areas have undergone intensive urban development in recent years (California Department of Conservation 1996, 1998, 2000, 2002). The total human population of the counties in the Bay Area region increased by approximately 17 percent between 1990 and 2000 (4.5 million to 5.3 million people) (California Department of Finance 1998). Most of the California tiger salamander natural historic habitat (vernal pool grasslands) available in this region has been lost due to urbanization and conversion to intensive agriculture (Keeler-Wolf and Elaml 1998). California tiger salamanders are now primarily restricted to artificial breeding ponds, such as bermed ponds or stock ponds which are typically located at higher elevations (CDFG 2008).

Of the 140 California tiger salamander localities where wetland habitat was identified, only 7 percent were located in vernal pools (CDFG 2008). The Bay Area region occurs within the Central Coast and Livermore vernal pool regions (Keeler-Wolf et al. 1998). Vernal pools within the Coast Range are more sporadically distributed than vernal pools in the Central Valley (Holland 2003). In San Benito and Santa Clara counties, Central Coast vernal pools have been destroyed and degraded due to agriculture. The vernal pools at Stanford in Santa Clara County have been destroyed and degraded due to recreation and development (Keeler-Wolf et al. 1998). The annual loss of vernal pools from 1994 to 2000 in Monterey, San Benito, San Luis Obispo, Santa Barbara, and Ventura counties was 2 to 3 percent. This rate of loss suggests that vernal pools in these counties are disappearing faster than previously reported (Holland 2003). Most of the vernal pools in the Livermore Region in Alameda County have been destroyed or degraded by urban development, agriculture, water diversions, poor water quality, and long-term overgrazing (Keeler-Wolf et al. 1998). During the 1980s and 1990s, vernal pools were lost at a 1.1 percent annual rate in Alameda County (Holland 1998).

Due to the extensive losses of vernal pool complexes and their limited distribution in the Bay Area region, many California tiger salamander breeding sites consist of artificial water bodies. Overall, 89 percent (124) of the identified water bodies are stock, farm, or berm ponds used by cattle grazing and/or as a temporary water source for small farm irrigation (CDFG 2008). This possibly places the California tiger salamander at great risk of hybridization with non-native tiger salamanders, especially in Santa Clara and San Benito counties. Without long-term maintenance, the longevity of artificial breeding habitats is uncertain relative to naturally occurring vernal pools that are dependent on the continuation of seasonal weather patterns (Shaffer in litt. 2003).

Shaffer et al. (1993) found that the East Bay counties of Alameda and Contra Costa supported the greatest concentrations of California tiger salamander. California tiger salamander populations in the Livermore Valley are severely threatened by the ongoing conversion of grazing land to subdivisions and vineyards (Stebbins 1989; East Bay Regional Park District 1999). Proposed land conversion continues to target large areas of California tiger salamander habitat. One such project in Alameda County totals 700 acres (283 hectares) (East Bay Regional Parks District 2003). Other proposed projects located within the California tiger salamander's distribution include another 310-acre (125-hectare) project in Alameda County, two in San Joaquin County totaling 12,427 acres (5,029 hectares), and a 19-acre (7.7-hectare) project in Santa Clara County.

ENVIRONMENTAL BASELINE

The action area is not located within designated critical habitat; however, it is located approximately 1.7 miles northwest of the East Bay Region Unit 13, 3 miles south of Unit 9, and 5.1 miles southwest of Unit 11 (USFWS 2005). According to the biological assessment, there are nine reported occurrences of California tiger salamanders within five miles of the project

footprint. The nearest occurrence (Occ. # 184) is located east of the SR 152/Bloomfield Avenue intersection in a cattle pond within grazed grasslands. Richard Vonarb of Caltrans observed greater than 25 young salamanders during spring surveys in 1992. Several other occurrences have been reported within the foothills that near the project 1-mile to the east and 3.6 miles to the southwest. Foothill habitat is predominantly characterized by non-native annual grassland, oak savannah, and mixed oak woodland. California tiger salamanders are distributed throughout the foothills and all life stages have been reported in cattle ponds, stock ponds, and adjacent uplands in the valley bottom south of the City of Gilroy.

According to the biological assessment, habitat within the action area consists of ruderal non-native annual grassland, agriculture, rural development, and channelized waters comprising roadside ditches, which provides suitable upland and seasonal non-breeding aquatic habitat for California tiger salamanders. No barriers exist between the action area and the foothills 1-mile to the northeast and three potential breeding ponds are located between 1.2 and 1.6 miles to the northeast; the nearest of which is within the maximum 1.3 mile dispersal/migration distance reported for California tiger salamanders. In addition, there are no barriers to the movement or dispersal of California tiger salamanders between the ponds and upland habitat to the northeast.

The Service has determined that suitable upland and seasonal non-breeding aquatic habitat is present within the action area and is within the maximum dispersal range for California tiger salamanders. The burrows within the action area could provide refugia to salamanders transiting the action area from breeding sites or upland habitat to the northeast. There are also ground squirrel burrows and other features that provide potential upland refugia for the California tiger salamander within and immediately adjacent to the action area. Based on the prevalence of California tiger salamanders within the adjacent foothills, potential breeding pond 1.2 miles to the northeast, connectivity to adjacent occupied habitats, and the presence of suitable upland habitat within and adjacent to the action area, the Service has determined there is a reasonable potential for California tiger salamanders to inhabit or disperse through the action area.

EFFECTS OF THE ACTION

California Red-legged Frog and California Tiger Salamanders

The proposed action is likely to adversely affect the California red-legged frog and California tiger salamander through direct mortality, injury, or harassment of individual sub-adults and adults resulting from being crushed by rocks or equipment, entombed in dens during construction activities, vehicle strikes, falling into trenches or pits, or harassment from noise, vibration or light. The California red-legged frog and California tiger salamander may be indirectly affected by construction activities temporarily removing foraging and non-breeding aquatic habitat, blocking travel corridors along Pacheco Creek, and increasing their risk to depredation by predators attracted to food or trash at the site. The proposed action will result in the temporary loss and degradation of 1.05 acres (0.42 hectare) and the permanent loss of 3.17 acres (1.28 hectares) of California red-legged frog and California tiger salamander habitat.

Mortality, injury, or harassment of the California red-legged frog and the California tiger salamander could occur from being crushed by rocks, equipment or vehicles within the action area. Individuals of these two listed species also could fall into trenches, pits, or other excavations, and then be directly killed or unable to escape and be killed due to desiccation, entombment, or starvation, or could be harassed by noise, vibration or light. Construction activities could cause individuals of both species to circumnavigate the action area thereby increasing their risk to predation and vehicle strikes.

Various other work activities associated with the proposed action also may adversely affect California red-legged frogs and California tiger salamanders. Trash left during or after project

activities could attract predators to work sites, which could subsequently harass or prey on the animals. For example, raccoons, crows, and ravens are attracted to trash and also prey opportunistically on amphibians. Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or habitat to a degree where frogs and salamanders are adversely affected. Some potential also exists for disturbance of habitat which could result in the spread or establishment on non-native invasive plant species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Numerous non-Federal activities continue to negatively affect the California red-legged frog and California tiger salamander in the action area. Habitat loss or degradation as a result of road and utility construction and maintenance, overgrazing, agricultural expansion, and water irrigation and storage projects that may not be funded, permitted, or constructed by a Federal agency. Other threats include contamination, poisoning, increased predation, and competition from non-native species associated with human development. Small private actions that may impact listed species, such as conversion of land, ground squirrel reduction efforts, mosquito control, and residential development, may occur without consultation with or authorization by the Service or the California Department of Fish and Game pursuant to their respectively Endangered Species Act.

From 1995 to 2020, the human population is projected to increase by 18 percent for the San Francisco Bay hydrologic region while at the same time agricultural crop land use in the region is projected to remain around 65,000 acres (California Department of Water Resources 1998). According the California Department of Forestry, from 2000 to 2020, the human population within counties in the Bay Area region is expected to grow by 29 percent (5.3 million people to 6.8 million people), and by 60 percent from 2000 to 2040 (5.3 million people to 8.4 million people) (California Department of Forestry 1998). There will likely be many other development projects that occur during this timeframe due to increases in human population growth that will continue to imperil the California red-legged frog and California tiger salamander.

There is a continued demand for new housing in Santa Clara and San Benito counties. Considering this, the remaining open space adjacent to the State Route 152 is likely threatened by future development. Development of adjacent wildlife habitat will continue to result in the loss of not only breeding, resting, and foraging habitat, but the loss of dispersal corridors between breeding populations, thereby further isolating and fragmenting wildlife populations. Additionally, development of small reservoirs or water bodies, such as golf course hazards, and water diversions may occur which may pose further threats such as disruption of dispersal corridors for terrestrial species, and competition or predation from with non-native species such as bullfrogs for aquatic species.

The global average temperature has risen by approximately 0.6 degrees centigrade during the 20th Century (International Panel on Climate Change 2001, 2007; Adger et al 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger et al. 2007), and that it is "very likely" that it is largely due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan et al. 2005, EPA Global Warming webpage http://yosemite.epa.gov; Adger et al. 2007). Eleven of the twelve years between 1995 and 2006 rank among the

twelve warmest years since global temperatures began in 1850 (Adger et al. 2007). The warming trend over the last fifty years is nearly twice that for the last 100 years (Adger et al. 2007). Looking forward, under a high emissions scenario, the International Panel on Climate Change estimates that global temperatures will rise another four degrees centigrade by the end of this Century; even under a low emissions growth scenario, the International Panel on Climate Change estimates that the global temperature will go up another 1.8 degrees centigrade (International Panel on Climate Change 2001). The increase in global average temperatures affects certain areas more than others. The western United States, in general, is experiencing more warming than the rest of the Nation, with the 11 western states averaging 1.7 degrees Fahrenheit warmer temperatures than this region's average over the 20th Century (Saunders et al. 2008). California, in particular, will suffer significant consequences as a result of global warming (California Climate Action Team 2006). In California, reduced snowpack will cause more winter flooding and summer drought, as well as higher temperatures in lakes and coastal areas. The incidence of wildfires in the Golden State also will increase and the amount of increase is highly dependent upon the extent of global warming. No less certain than the fact of global warming itself is the fact that global warming, unchecked, will harm biodiversity generally and cause the extinction of large numbers of species. If the global mean temperatures exceed a warming of two to three degrees centigrade above pre-industrial levels, twenty to thirty percent of plant and animal species will face an increasingly high risk of extinction (International Panel on Climate Change 2001, 2007). The mechanisms by which global warming may push already imperiled species closer or over the edge of extinction are multiple. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (International Panel on Climate Change 2001, 2007; California Climate Action Team 2006; Lenihan et al. 2003). Extreme events, in turn may cause mass mortality of individuals and significantly contribute to determining which species will remain or occur in natural habitats. Ongoing global climate change (Anonymous 2007; Inkley et al. 2004; Adger et al. 2007; Kanter 2007) likely imperils the delta smelt and the resources necessary for their survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

CONCLUSION

After reviewing the current status of the California red-legged frog and California tiger salamander; the environmental baseline for the action area; the effects of the proposed State Route 152/Ferguson Road Intersection Realignment and Signalization Project and the cumulative effects; it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of these two listed species. Critical habitat for the California red-legged frog and California tiger salamander will not be adversely modified or destroyed since the project is not located within designated critical habitat for these species, and the proposed action will not diminish the value of the critical habitat, or prevent the critical habitat from sustaining its role in the conservation and recovery of the species.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an

extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by FHWA so that they become binding conditions of any grant or permit issued to Caltrans, as appropriate, in order for the exemption in section 7(o)(2) to apply. FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If FHWA (1) fails to require Caltrans to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect for the following reasons: their relatively small body size make the finding of a dead specimen unlikely; the secretive nature of the species; losses may be masked by seasonal fluctuations in numbers or other causes; and the species occurs in habitats that makes it difficult to detect. Due to the difficulty in quantifying the number of California red-legged frogs that will be taken as a result of the proposed action, the Service is quantifying take incidental to the proposed action as all of the California red-legged frogs inhabiting or utilizing the 8.05 acres (3.26 hectares) (permanent effects = 3.17 acres [1.28 hectares]; temporary effects = 1.05 acres [0.42 hectare]) of California red-legged frog upland habitat identified in the action area. The incidental take is expected to be in the form of capture, harm, harassment, injury, and mortality to adult California red-legged frogs from habitat loss/degradation, construction-related disturbance, and capture and relocation.

The Service anticipates that incidental take of the California tiger salamander will be difficult to detect because when this amphibian is not in their breeding ponds, or foraging, migrating, or conducting other surface activity, it inhabits rodent burrows or other underground refugia; upland refugia may be located a distance from the breeding ponds; the migrations occur on a limited period during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of its relatively small body size. Losses of this species may also be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in the water regime at their breeding ponds, or additional environmental disturbances. Due to the difficulty in quantifying the number of California tiger salamander that will be taken as a result of the proposed action, the Service is quantifying take incidental to the proposed action as all of the California tiger salamander inhabiting or utilizing the 8.05 acres (3.26 hectares) (permanent effects = 3.17 acres [1.28 hectares]; temporary effects = 1.05 acres [0.42 hectare]) of California tiger salamander upland habitat identified in the action area. The incidental take is expected to be in the form of capture, harm, harassment, injury, and mortality to adult California tiger salamanders from habitat loss/degradation, construction-related disturbance, and capture and relocation.

Upon implementation of the following reasonable and prudent measures incidental take associated with the proposed action described above for the California red-legged frog and California tiger salamander will become exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the California red-legged frog and California tiger salamander, and is not likely to jeopardize the continued existence of these species. Critical habitat for the California red-legged frog and California tiger salamander will not be adversely modified or destroyed, since the action area is not located within designated critical habitat.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize the effect of the proposed action on the California red-legged frog and California tiger salamander:

1. The California Department of Transportation shall implement conservation measures for the California red-legged frog and California tiger salamander to minimize (1) the effects of the loss of habitat that will occur as a result of the project; (2) the potential for harassment, harm, injury, and mortality to these two listed species; and (3) the potential for inadvertent capture or entrapment of federally listed wildlife species during construction activities.
2. The California Department of Transportation shall ensure their compliance with this biological opinion.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, FHWA shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. The following Terms and Conditions implement Reasonable and Prudent Measure one (1):
    a. Caltrans shall minimize the potential for harm, harassment, or killing of federally listed wildlife species resulting from proposed action related activities by implementation of the conservation measures as described in the Biological Assessment, letter from the Caltrans to the Service dated December 26, 2008, and appearing in the project description of this biological opinion.
    b. Caltrans shall include Special Provisions that include the proposed conservation measures and the terms and conditions of this biological opinion in the solicitation for bid information for all contracts for the project that are issued by them to all contractors.
    c. The Resident Engineer or their designee shall be responsible for implementing the conservation measures and Terms and Conditions of this biological opinion and shall be the point of contact for the proposed action. The Resident Engineer shall maintain a copy of this biological opinion onsite whenever construction is taking place. Their name and telephone number shall be provided to the Service at least thirty (30) calendar days prior to groundbreaking at the project. Prior to ground breaking, the Resident Engineer must submit a letter to the Service verifying that they posses a copy of this biological opinion and have read the Terms and Conditions.
    d. The construction area shall be delineated with high visibility temporary fencing at least 4 feet (1.2 meters) in height, flagging, or other barrier to prevent

encroachment of construction personnel and equipment onto any sensitive areas during project work activities. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site. Actions within the project area shall be limited to the project footprint as described in the project description presented above. No project activities will occur outside the delineated project construction area.

e. Onsite Construction Personnel Education Program. A construction personnel education program will occur before the start of construction so that the USFWS-approved biologist can explain to construction personnel how best to avoid the accidental take of California red-legged frogs and California tiger salamanders. The approved biologist will conduct a training session that will be scheduled as a mandatory informational field meeting by the Caltrans resident engineer for contractors and all construction personnel. The field meeting will include topics on species identification, life history, descriptions, habitat requirements during various life stages, and the species' protected status. Emphasis will be placed on the importance of the habitat and life-stage requirements within the context of project avoidance and minimization measures. Handouts, illustrations, photographs, and/or project mapping that show the areas where minimization and avoidance measures are being implemented will be included as part of this education program. The program will increase contractors', and construction workers' awareness about existing federal and state laws regarding endangered species, as well as increase compliance with conditions and requirements of both Caltrans and resource agencies.

f. A qualified biologist(s) shall be onsite during all activities that may result in the take of the California red-legged frog, and/or California tiger salamander. The qualifications of the biologist(s) must be presented to the Service for review and written approval prior to ground-breaking at the project site. The Service-approved biologist(s) will keep a copy of this biological opinion in their possession when onsite. The Service-approved biologist(s) shall have oversight over implementation of all the Terms and Conditions in this biological opinion, and shall have the authority to stop project activities, through communication with the Resident Engineer, if any of the requirements associated with these Terms and Conditions are not being fulfilled. If the Service-approved biologist(s) exercises this authority, the Service shall be notified by telephone and electronic mail within one (1) working day. The Service contact is Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Division at the Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

g. Only Service-approved biologist(s) who are familiar with the biology and ecology of the California red-legged frog and California tiger salamander shall capture or handle theses listed species.

h. Prior to any ground disturbance, pre-construction surveys shall be conducted by a Service-approved biologist for the California red-legged frog and California tiger salamander. These surveys shall consist of walking surveys of the project limits and adjacent areas accessible to the public to determine presence of the species.

i. To prevent harassment, injury or mortality of California red-legged frog and/or California tiger salamander or destruction of their dens or burrows by dogs or cats, no canine or feline pets shall be permitted in the action area.

j. Permanent and temporary disturbances and other types of project-related disturbance to the habitats of the California red-legged frog, and California tiger salamander shall be minimized to the maximum extent practicable by Caltrans. To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas also should be included in pre-construction surveys and, to the maximum extent possible, should be established in locations disturbed by previous activities to prevent further adverse effects.

k. The following shall be implemented for staging, storage, lay down, vehicle access, parking, helicopter landing, borrow, or disposal areas associated with the project:

   i. Caltrans shall require as part of the construction contract that all contractors comply with the Act in the performance of the work necessary for project completion performed inside and outside the project right-of-way.

   ii. Caltrans shall require documentation from the contractor that aggregate, fill, or borrow material provided for the project was obtained in compliance with the Act. Evidence of compliance with the Act shall be demonstrated by providing the Resident Engineer any one of the following:

      1. A letter from the Service stating use of the borrow pit area shall not result in the incidental take of listed species;

      2. An incidental take permit for contractor-related activities issued by the Service pursuant to section 10(a)(1)(B) of the Act;

      3. A biological opinion or a letter concurring with a "not likely to adversely affect" determination issued by the Service to the Federal agency having jurisdiction over contractor-related activities;

      4. Letter from the Service concurring with the "no effect" determination for contractor-related activities; or

      5. Contractor submittal of information to the Caltrans Resident Engineer indicating compliance with the State Mining and Reclamation Act (SMARA) and provide the County land use permits and California Quality Act (CEQA) clearance.

   iii. If a staging, storage, lay down, vehicle access, parking, helicopter landing, borrow, or disposal area that is in compliance with the Act is not available, Caltrans shall either:

      1. Identify/select a site that the Service has concurred with the "no effect" determination, or;

      2. Request reinitiation of formal consultation on the action considered herein based on new information.

California Red-Legged Frog and California Tiger Salamander Protective Measures

l. To prevent inadvertent entrapment of California red-legged frogs, California tiger salamanders, or other animals during construction, at the end of each work day, all excavated, steep-walled holes or trenches more than 2 ft (0.6 m) deep will be covered with plywood or similar materials or will be filled with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If, at any

time, a trapped California red-legged frog, California tiger salamander, or other wildlife is discovered, Service and CDFG will be contacted within 24 hours of discovery.

m. Plastic mono-filament netting (erosion control matting) or similar material shall not be used at the project site because California red-legged frogs or California tiger salamanders may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

n. Proposed Conservation Measures to minimize effects on California red-legged frog shall also be implemented for the California tiger salamander. The Service-approved biologist will monitor burrows and channelized waters for California tiger salamanders. In the event that a California tiger salamander is found, it shall be relocated to the nearest suitable burrow outside of the construction area on the same side of SR 152 that it was found; this location will be determined by a qualified biologist in consultation with the Service. The relocated individual(s) will be monitored until it is determined that the animal(s) is not imperiled by predators or other dangers. Handling and relocation of California tiger salamanders shall be conducted in the same manner as described for the California red-legged frog and shall take precautions to prevent introduction of amphibian diseases in accordance with the Interim Survey Guidance (USFWS 2003). Disinfecting equipment and clothing is especially important when biologists are coming to the action area to handle salamanders or frogs after working in other aquatic habitats

2. The following Terms and Conditions implement Reasonable and Prudent Measure two (2):

a. If requested, before, during, or upon completion of ground breaking and construction activities, Caltrans shall allow access by Service and/or California Department of Fish and Game personnel to the project site to inspect project effects to the San Joaquin kit fox, California red-legged frog, and California tiger salamander, and their habitats.

b. Caltrans shall submit a post-construction compliance report prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within 60 calendar days following project completion or within 60 calendar days of any break in construction activity lasting more than 60 calendar days. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the San Joaquin kit fox, California red-legged frog, and California tiger salamander, if any; (v) occurrences of incidental take of any of these three species; (vi) documentation of employee environmental education; and (vii) other pertinent information. The reports shall be addressed to the Chief of the Endangered Species Division, Sacramento Fish and Wildlife Office.

c. Caltrans shall report to the Service any information about take or suspected take of listed wildlife species not authorized in this biological opinion. Caltrans must notify the Service via electronic mail and telephone within 24 hours of receiving such information. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. The individual animal shall be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The

Service contacts are Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Program at the Sacramento Fish and Wildlife Office (916)414-6600), and Dan Crum, Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660.

Reporting Requirements

Injured California red-legged frogs and/or California tiger salamanders must be cared for by a licensed veterinarian or other qualified person; dead individuals of any of these three listed species should be preserved according to standard museum techniques and held in a secure location. The Service and the California Department of Fish and Game must be notified within one (1) working day of the discovery of death or injury to a California red-legged frog and/or California tiger salamander that occurs due to project related activities or is observed at the project site. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Program at the Sacramento Fish and Wildlife Office (916)414-6600), and Dan Crum, Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660.

Caltrans shall submit a post-construction compliance report prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within sixty (60) calendar days of the date of the completion of construction activity. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the California red-legged frog and California tiger salamander, if any; (v) occurrences of incidental take of any of these four listed species, if any; (vi) documentation of employee environmental education; and (vii) other pertinent information.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases. We have the following conservation recommendations:

1. Caltrans should assist the Service in implementing recovery actions identified in the *Recovery Plan for the California Red-legged Frog* (USFWS 2002).
2. Caltrans should consider participating in the planning for a regional habitat conservation plan for the California red-legged frog, California tiger salamander, other listed species, and sensitive species.
3. Caltrans should consider establishing functioning preservation and creation conservation banking systems to further the conservation of the California red-legged frog, California tiger salamander, and other appropriate species. Such banking systems also could possibly be utilized for other required mitigation (i.e., seasonal wetlands, riparian habitats, etc.) where appropriate.
4. Sightings of any listed or sensitive animal species should be reported to the California Natural Diversity Database of the California Department of Fish and Game. A copy of the

reporting form and a topographic map clearly marked with the location the animals were observed also should be provided to the Service.

5. Caltrans should incorporate culverts, tunnels, or bridges on highways and other roadways that allow safe passage by California red-legged frog, California tiger salamander, other listed animals, and wildlife. Caltrans should include photographs, plans, and other information in their biological assessments if they incorporate "wildlife friendly" crossings into their projects.
6. Caltrans should provide habitat for bats, including surfaces for bat roosts on the underside of bridges and other structures whenever possible.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of these recommendations.

REINITIATION--CLOSING STATEMENT

This concludes the conference for effects of the proposed State Route 152/Ferguson Road Intersection Realignment and Signalization Project, Santa Clara County, California, on the California red-legged frog and California tiger salamander. The request must be in writing. If the Service reviews the project and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

This concludes formal consultation on the proposed State Route 152/Ferguson Road Intersection Realignment and Signalization Project, Santa Clara County, California. As provided in 50 CFR §402.16 and in the terms and conditions of this biological opinion, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have questions concerning this opinion on proposed State Route 152/Ferguson Road Intersection Realignment and Signalization Project, Santa Clara County, California, you can contact this office at the letterhead address or at (916) 414-6625.

Sincerely,

Cay C. Goude

Cay C. Goude
Acting Field Supervisor

cc:
Melissa Escaron, California Department of Fish and Game, Oakland, California
David Johnson, California Department of Fish and Game, Santa Cruz, California

SR 152/Ferguson Road Realignment
Santa Clara County, California
EA 04-2A2601
December 2010

Storm Water Information Handout

Prepared for:

Caltrans

Prepared by:

WRECO

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Disclaimer

A "Disclaimer" is required specifying that the information provided in the Storm Water Information Handout is just a guideline and is to be used for information purposes only and should not be considered a sole source document to adhere to the requirements of the new National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP), Number CAS000002, adopted on September 2, 2009. The contractor is required to provide water quality monitoring, sampling and implement best management practices (BMPs) based on standard industry operations, field conditions and conditions encountered based on the contractor's means and methods. The information in this handout is not to be construed in any way as a waiver of the provisions in the CGP. Bidders and contractors are cautioned to make independent investigations and examinations as they deem necessary to satisfy the conditions encountered in performance of work, with respect to the following: sampling and monitoring locations, distribution of watershed areas for sizing of BMPs, and selection of BMPs in order to conform to the requirement of the contract documents and the CGP.

1 OVERVIEW

1.1 Intent of this Document

The objectives of this Water Quality Information Handout are: to summarize general water quality information of the Project; to summarize updated requirements per the Construction General Permit (CGP) effective starting July 1, 2010; to provide general guidelines for contractors to bid on the project; to aid in developing the Storm Water Pollution Prevention Plan (SWPPP) of the project; and, to highlight information necessary to file Project Registration Documents (PRDs) to the State Water Resources Control Board via the Stormwater Multi Application Reporting and Tracking System (SMARTS) and file the Notice of Intent at the start of construction.

1.2 Summary of New Requirements

A new CGP was adopted on September 2, 2009 and has been effective starting July 1, 2010. This revised "National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities" (NPDES Number CAS000002) regulates discharges from construction activities within the Project area.

The new CGP is based on a risk level permitting approach. There are 3 levels of risk, RL 3 being the highest. Risk level (RL) is calculated by 1) project sediment risk, and 2) receiving water risk.

Risk Level 1 projects will be subject to minimum BMP implementation and visual monitoring requirements, Risk Level 2 projects will be subject to Numeric Action Levels (NALs) and some additional monitoring requirements, and Risk Level 3 projects will be subject to Numeric Effluent Limitations (NELs), and more rigorous monitoring requirements such as receiving water monitoring and, in some cases bioassessment. All projects will have to upload storm water data into SMARTS, such as NOIs, SWPPPs, annual reports, and monitoring data, as applicable.

A risk assessment was done for the **SR 152/Ferguson Road Realignment**, and based on a number of factors set forth in the CGP, it was determined to be **Risk Level 2.** See the risk assessment calculations in Section 3.1 of this document for details.

2 GENERAL PROJECT INFORMATION

This section summarizes the Project location, features, site information, and site impacts.

2.1 Location

The Project is located in Santa Clara County, near the City of Gilroy, at the intersection of Route 152 and Ferguson Road. The Project is located between Post Mile (PM) 12.6 and PM 13.0 along Route 152. A vicinity map for the Project is included as Figure 1.

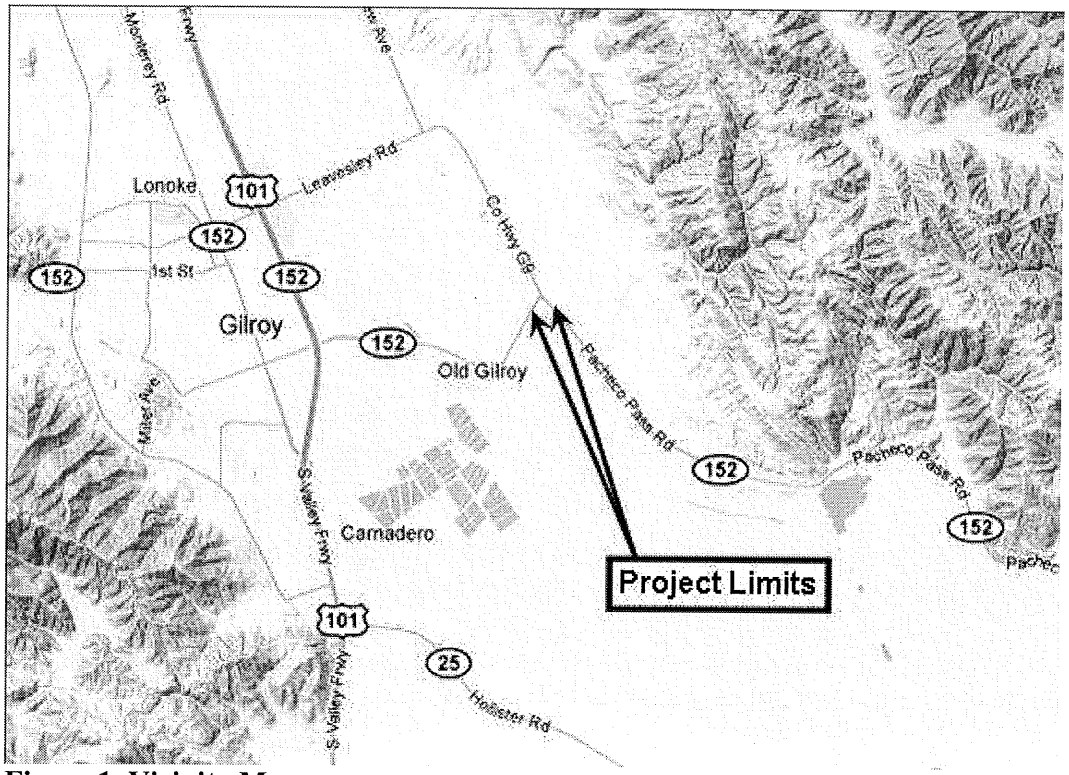


Figure 1. Vicinity Map

2.2 Major Engineering Features

New pavement sections will be constructed to accommodate through lanes, left and right-turn lanes, and outside shoulders. In addition, the existing roadway will be resurfaced with hot mix asphalt. The existing drainage facilities including unlined ditches and gutters, drainage inlets and culverts will be reconstructed to restore and improve the drainage. There are no existing structures within the project area and no new structures are proposed.

2.3 Receiving Water Bodies

The receiving water bodies are Johnson Creek located about 200 feet southwest of the project limits and Dexter Creek further southwest, tributaries of Llagas Creek located

south, which eventually drain south to Pajaro River. Storm water runoff from the project area drains directly through the unlined gutters, or indirectly from unlined gutter draining through the culverts to Johnson Creek. Johnson Creek and Dexter Creek discharge to Pajaro River from the western end of the project limits (Water Quality Planning Tool, California State University at Sacramento).

The Project area is under Hydrologic Sub Area 305.30, which has a watershed area of 129, 893 ac and an average annual rainfall of 17.7 in. The Central Coast Regional Water Quality Control Board (RWQCB) has jurisdiction within the project.

Llagas Creek and Pajaro River are both on the 2006 Clean Water Act (CWA) 303(d) List of Water Quality Limited Segments for the following pollutants, listed in Table 1. The current Caltrans targeted design constituents (TDCs) are Nitrate, Nutrients, and Sedimentation/Siltation for both water bodies (Water Quality Planning Tool).

Table 1. Receiving Water Bodies on 303(d) List

Water Body on 303(d) List	Pollutants
Llagas Creek	• Chloride • Fecal Coliform • Low Dissolved Oxygen • Nitrate* • Nutrients* • pH • Sedimentation/Siltation* • Sodium • Total Dissolved Solids
Pajaro River	• Boron • Nitrate* • Nutrients* • Sedimentation/Siltation*

*Targeted design constituent (TDC)

The RWQCB Basin Plan establishes beneficial uses for water bodies within the region. Llagas Creek and Pajaro River have listed beneficial uses, listed in Table 2; Johnson Creek and Dexter Creek do not.

Table 2. Receiving Water Body Beneficial Uses

Water Body	Beneficial Uses
Llagas Creek	• Municipal and Domestic Supply (MUN) • Agricultural Supply (AGR) • Industrial Service Supply (IND) • Groundwater Recharge (GWR) • Contact/Non-Contact Water Recreation (REC1/REC2) • Wildlife Habitat (WILD) • Cold Freshwater Habitat (COLD) • Warm Freshwater Habitat (WARM) • Fish Migration (MIGR) • Fish Spawning (SPWN) • Freshwater Replenishment (FRSH) • Ocean, Commercial, and Sport Fishing (COMM)
Pajaro River	• Municipal and Domestic Supply (MUN) • Agricultural Supply (AGR) • Industrial Service Supply (IND) • Groundwater Recharge (GWR) • Contact/Non-Contact Water Recreation (REC1/REC2) • Wildlife Habitat (WILD) • Cold Freshwater Habitat (COLD) • Warm Freshwater Habitat (WARM) • Fish Migration (MIGR) • Fish Spawning (SPWN) • Preservation of Rare and Endangered Species (RARE) • Ocean, Commercial, and Sport Fishing (COMM))

Source: Central Coast Water Quality Control Plan (Basin Plan), 1994.

2.4 Creek Crossings

The Project area does not include any creek crossings

2.5 Climate and Rainfall

According to weather station data from the National Oceanic and Atmospheric Administration (NOAA), the Project area has an average of 36.6 rainy days per year; 13.7 days per year receive at least 0.5 inches of precipitation. See Figure 2 for precipitation data and Figure 3 for Intensity-Duration-Frequency data.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Service

Climatography of the United States No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: GILROY, CA

COOP ID: 043417

Climate Division: CA 4 NWS Call Sign: Elevation: 194 Feet Lat: 37°00N Lon: 121°34W

Precipitation (inches)

	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount									
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution									
Month	Mean	Median	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	4.30	3.11	4.55	1963	31	11.89	1997	.21	1976	10.5	7.1	3.1	1.3	.29	.55	1.09	1.68	2.34	3.11	4.03	5.21	6.85	9.62	12.36
Feb	4.10	3.01	3.21	1963	1	13.18	1998	.16	1997	8.6	5.7	2.6	1.1	.30	.56	1.08	1.65	2.28	3.00	3.87	4.98	6.52	9.10	11.66
Mar	3.64	2.86	2.82	1991	4	13.22	1991	.02	1972	9.9	6.6	2.7	.8	.21	.42	.87	1.36	1.92	2.58	3.38	4.40	5.84	8.28	10.71
Apr	1.16	.71	3.65	1958	3	4.68	1982	.00	1977	5.3	3.1	.5	.2	.03	.11	.27	.44	.62	.84	1.10	1.42	1.88	2.64	3.39
May	.41	.13	1.87	1996	16	2.34	1996	.00+	1992	2.7	1.0	.1	.1	.00	.00	.00	.01	.06	.14	.26	.43	.69	1.18	1.69
Jun	.10	.00	.77	1967	2	.76	1993	.00+	1999	.8	.5	.0	.0	.00	.00	.00	.00	.00	.00	.03	.09	.18	.34	.50
Jul	.06	.00	.66	1974	9	.80	1974	.00+	2000	.3	.2	.1	.0	.00	.00	.00	.00	.00	.00	.00	.00	.01	.15	.38
Aug	.05	.00	.68	1976	19	1.00	1976	.00+	2000	.4	.2	@	.0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.11	.35
Sep	.33	.02	5.97	1959	19	2.67	1976	.00+	1998	1.3	.7	.2	@	.00	.00	.00	.00	.00	.01	.07	.21	.47	.94	1.55
Oct	.93	.57	1.97	1981	28	3.18	2000	.00+	1999	3.1	1.8	.7	.2	.00	.00	.03	.16	.32	.52	.78	1.11	1.59	2.41	3.27
Nov	2.52	1.59	2.54	1972	15	7.50	1972	.00	1992	7.4	4.3	1.8	.7	.03	.14	.41	.74	1.13	1.61	2.22	3.01	4.14	6.11	8.09
Dec	3.00	2.88	2.81	1995	12	9.15	1996	.01	1989	8.9	5.4	1.9	.8	.18	.35	.72	1.12	1.59	2.13	2.79	3.63	4.81	6.82	8.82
Ann	20.60	21.39	5.97	Sep 1959	19	13.22	Mar 1991	.00+	Aug 2000	59.2	36.6	13.7	5.2	9.07	10.92	13.48	15.57	17.53	19.50	21.61	24.03	27.09	31.73	35.92

+ Also occurred on an earlier date(s)
# Denotes amounts of a trace
@ Denotes mean number of days greater than 0 but less than .05
** Statistics not computed because less than six years out of thirty had measurable precipitation

(1) From the 1971-2000 Monthly Normals
(2) Derived from station's available digital record: 1957-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

079-B

Figure 2. Precipitation Information

WINIDF v. 1.0 REPORT. 8/27/2009

GENERAL INFORMATION:

Input by: Caltrans Hydraulics
Input date: 08/27/2009
Project description: Highway 152, Ferguson Intersection, PM 12.8

SITE DATA:

Latitude: 37.01 deg.
Longitude: 121.516 deg.
Return Period: 25 years

SELECTED STATIONS:

Station Name	Station ID	Elev. ft	Lat. deg.	Long. deg.	Dist. miles
GILROY 8NE	D103419000	1050	37.033	121.450	3.97

COMPUTED INTENSITIES (INCHES/HOUR)

Return Period Duration	25-yr	2-yr	10-yr	25-yr	50-yr	100-yr	10,000-yr
5-min	2.972	1.471	2.498	2.977	3.319	3.661	5.816
10-min	2.109	1.044	1.772	2.112	2.355	2.598	4.127
15-min	1.725	0.854	1.450	1.728	1.927	2.125	3.377
30-min	1.224	0.606	1.029	1.226	1.367	1.508	2.396
60-min	0.869	0.430	0.730	0.870	0.970	1.070	1.700
120-min	0.616	0.305	0.518	0.617	0.688	0.759	1.206
4-hr	0.437	0.216	0.368	0.438	0.488	0.539	0.856
8-hr	0.310	0.154	0.261	0.311	0.347	0.382	0.607
16-hr	0.220	0.109	0.185	0.221	0.246	0.271	0.431
24-hr	0.180	0.089	0.151	0.180	0.201	0.222	0.353

OUTPUT COEFFICIENTS
a = 0.8686
b = -0.4950

Note: 25-yr on the 1st column is from curve fitting for calculating 25-yr rainfall intensity at different time of concentration in hours. I.e.

$$I_{25}\ (in/hr) = a * T_c\ (hr)^b = 0.8686 * T_c\ (hr)^{-0.4950}$$

Figure 3. Intensity-Duration-Frequency Data

2.6 Topography

The project site lies on a flat topography and the area is primarily agricultural with some minor residential use.

2.7 Soils and Geology

The project site lies on a Quaternary alluvium and the soils in the project area are Campbell silty clay loam, Pleasanton gravelly loam, Rincon clay loam, and Zamora loam, categorized as Hydrologic Soil Groups (HSGs) B, C, and D (California's Groundwater Bulletin 118, 2003). All soils within the project limits indicate moderate erodibility.

The project area is located in the Llagas Area groundwater sub-basin 3-3.01 in the Central Coast Hydrologic Region (California's Groundwater Bulletin 118, 2003). The Llagas Area sub-basin is located northerly of the Pajaro River and groundwater flows south toward the Pajaro River.

There are no domestic or municipal water supply reservoirs or ground water percolation facilities (i.e., High risk Areas) that the project activities can discharge directly (Caltrans District 4 Work Plan, 2009).

2.8 Hazardous Waste

A review of environmental regulatory agencies' database (e.g., EnviroStor, GeoTracker) shows no known contaminated and clean-up sites along the project corridor.

2.9 Existing (Pre-Construction) Control Practices

There are no existing treatments BMPs within the project limits prior to undertaking this project.

3 CONSTRUCTION GENERAL PERMIT

In accordance with the NPDES regulations, to minimize the potential effects of construction runoff on the quality of the receiving water bodies, the State requires that any construction activity affecting one acre or more must obtain coverage under the NPDES CGP. Permit applicants are required to prepare a Storm Water Pollution Prevention Plan (SWPPP) and implement BMPs to reduce construction effects on receiving water quality.

3.1 Risk Assessment

The CGP requirements include a risk assessment to determine the Project's impact risk to receiving water bodies. The risk assessment uses measurements of the Project's potential sediment risk and the sensitivity of the receiving water bodies to sediment to determine the risk level of the Project. This Project has a **Medium Site Sediment Risk Factor** and a **High Receiving Water Risk Factor**; the combined risk is **Level 2**. The risk factors are detailed in the following sections.

3.1.1 Sediment Risk

The sediment risk is based on the following equation from the adopted CGP "Fact Sheet" (Section J.1.a pg. 28):

Equation 1. Sediment Risk Equation
$A = (R)(K)(LS)(C)(P)$

Where:

R = Runoff erosivity factor (unitless)
K = Soil erodibility factor (unitless)
LS = Length-slope factor (unitless)
C = Cover factor (unitless)
P = Management operations and support practices (unitless)
A = Rate of sheet and rill erosion (tons/ac)

The rainfall runoff erosivity factor (R) was determined from the United States Environmental Protection Agency (EPA) "Rainfall Erosivity Factor Calculator for Small Construction Sites."

The soil erodibility factor (K) was determined from the United States Department of Agriculture Natural Resources Conservation Services "Web Soil Survey."

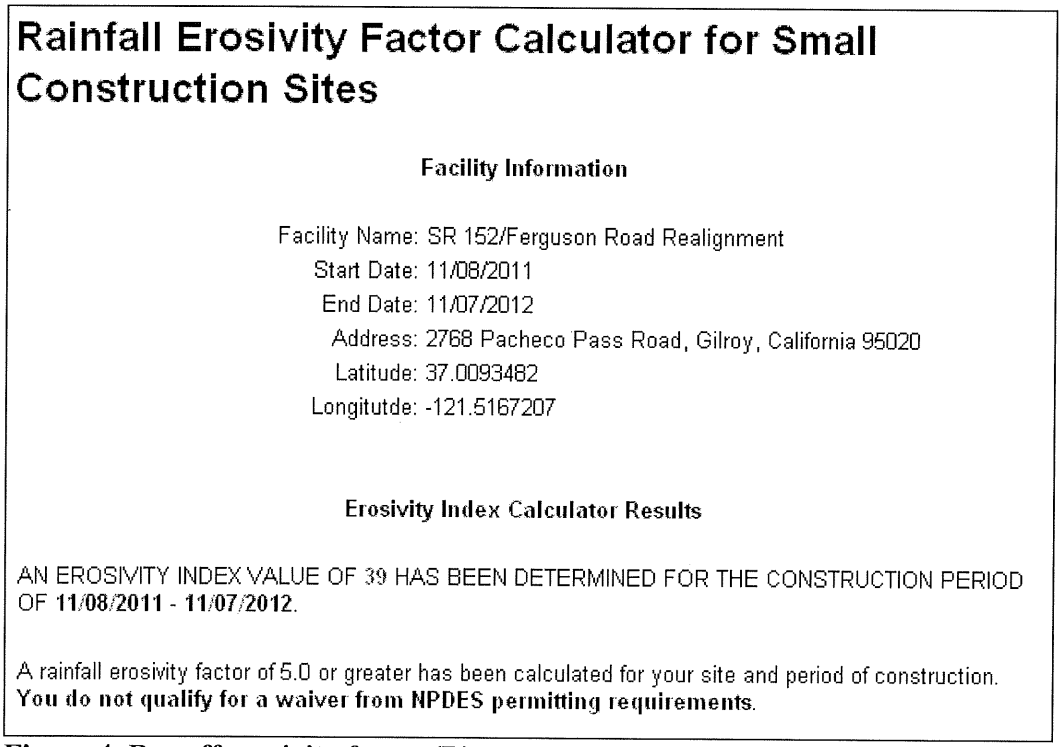
The length-slope factor (LS) was determined by examining the original grade delineated on the Typical Cross Sections included in the Contract Project Plans.

The cover factor (C) and management operations and support practices (P) are given values of 1.0 by the CGP to simulate bare ground conditions.

Values of these factors are listed below in Table 3. Based on these factors, the rate of sheet and rill erosion (A) is **17** tons per acre. Figure 7 shows the final assessment of the Project Sediment Risk.

Table 3. Sediment Risk Factor

Factor	Value
R (Runoff erosivity factor)	39
K (Soil erodibility factor)	0.37
LS (Length-slope factor)	1.23
C (Cover)	1
P (Management operations and support practices)	1
A (Rate of sheet and rill erosion)	17



Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: SR 152/Ferguson Road Realignment
Start Date: 11/08/2011
End Date: 11/07/2012
Address: 2768 Pacheco Pass Road, Gilroy, California 95020
Latitude: 37.0093482
Longitutde: -121.5167207

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF 39 HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **11/08/2011 - 11/07/2012**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction.
You do not qualify for a waiver from NPDES permitting requirements.

Figure 4. Runoff erosivity factor (R)

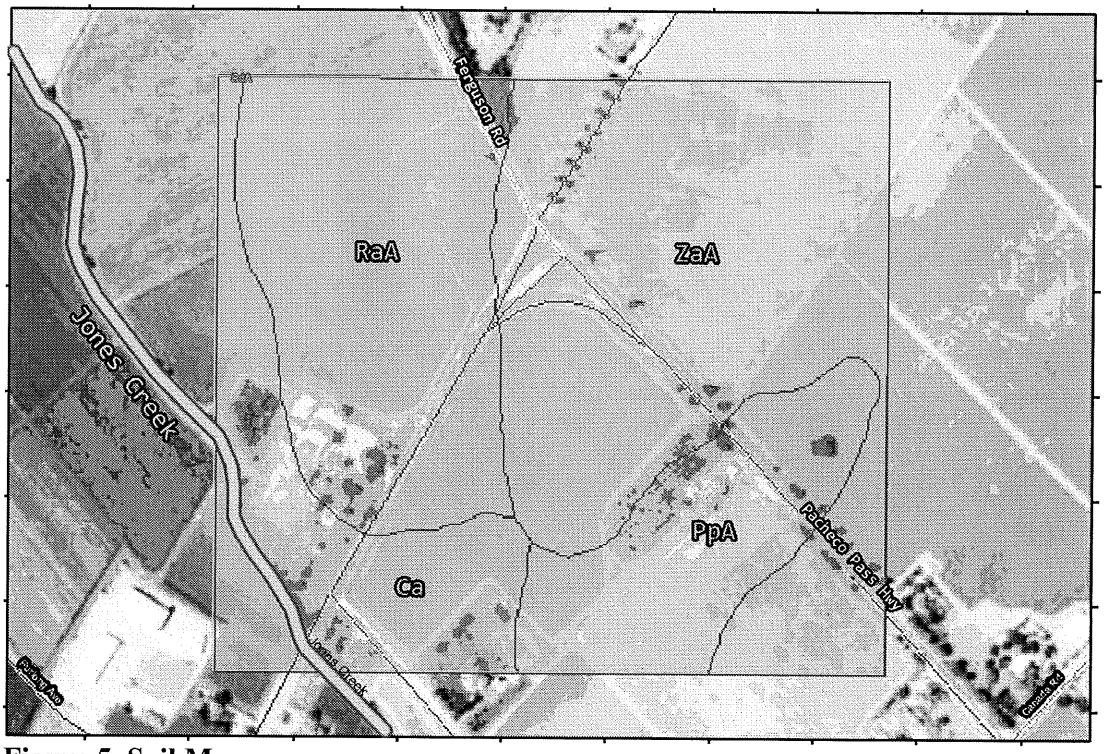


Figure 5. Soil Map

K Factor, Rock Free— Summary by Map Unit — Eastern Santa Clara Area, California				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Ca	Campbell silty clay loam	.37	15.3	17.0%
PpA	Pleasanton gravelly loam, 0 to 2 percent slopes	.37	12.8	14.2%
RaA	Rincon clay loam, 0 to 2 percent slopes	.37	23.7	26.4%
SdA	San Ysidro loam, 0 to 2 percent slopes	.43	0.0	0.0%
ZaA	Zamora loam, 0 to 2 percent slopes	.37	38.2	42.5%
Totals for Area of Interest			**90.1**	**100.0%**

Figure 6. Soil erodibility factor (K) based on soil map

Table 4. Length-slope factor (LS)

	Average Watershed Slope (%)			
Sheet Flow Length (ft)	**10.0**	**12.0**	**14.0**	**16.0**
<3	0.35	0.36	0.38	0.39
6	0.37	0.41	0.45	0.49
9	0.38	0.45	0.51	0.56
12	0.39	0.47	0.55	0.62
15	0.40	0.49	0.58	0.67
25	0.57	0.71	0.85	0.98
50	0.91	1.15	1.40	1.64
75	1.20	1.54	1.87	2.21
100	1.46	1.88	2.31	2.73

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site. http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	39
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted. Site-specific K factor guidance	
K Factor Value	0.37
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction. LS Table	
LS Factor Value	1.23
Watershed Erosion Estimate (=RxKxLS) in tons/acre	17.7489
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Medium**

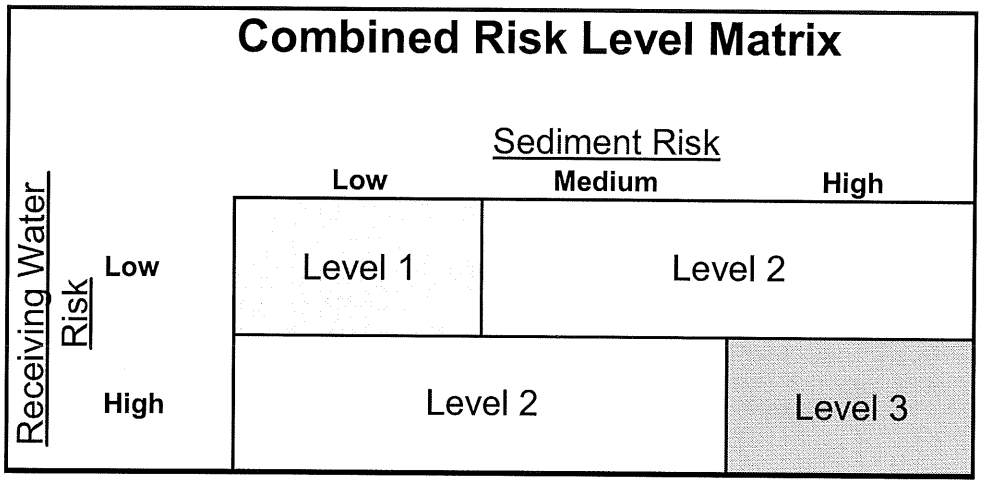
Figure 7. Sediment Risk Assessment

3.1.2 Receiving Water Body Risk

The Storm Water Data Report identifies the receiving water bodies for this Project to be at High Risk. As described in Section 2.3, both Llagas Creek and Pajaro River are identified on the CWA 303(d) List as being impaired by sediment. Additionally, both water bodies are also identified as having SPAWN, COLD, and MIGRATORY beneficial uses.

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	yes/no	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment?** For help with impaired waterbodies please check the attached worksheet or visit the link below: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml	Yes	High
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp		

Figure 8. Receiving Water Risk Assessment



Project Sediment Risk: Medium
Project RW Risk: High
Project Combined Risk: Level 2

Figure 9. Combined Risk Level Matrix

3.2 Notice of Termination (NOT)

The CGP provides both revised and new requirements for completion and approval of the NOT. The NOT requirements are presented in Section II.D of the new CGP permit "Order." These requirements include demonstrating through photos, computational proof or other "custom methods," such as results of testing and analysis, that the terms of the NOT have been satisfied.

While these methods of demonstrating compliance are at the option of the contractor, should the RWQCB determine that the visual photos do not adequately show compliance, further computational efforts may be required. This computational proof is obtained through the use of the Revised Universal Soil Loss Equation 2 (RUSLE2) program.

4 RUN-ON DISCHARGES

Run-on discharges are off-site storm water flows that can potentially run onto the site. The calculations use the Rational Method (see Equation 2) and are based on a rainfall intensity for a 2-year, 5-minute event. Caltrans Hydraulics provided a copy of the off-site watersheds map used for their hydrology studies. The watershed map was re-created using GIS software to allow for clearer readability and is included in Appendix C. Figure 10 shows the discharge calculations by watershed. Based on available topographic information the area slopes from east to west with minimal run-on or offsite flow to the westerly leg of SR 152.

These discharge calculations can be used to design storm water BMPs during construction. There are existing ditches and proposed ditches that would prevent "run-on" from impacting the roadway; however, if the Project is not staged in a manner to maintain these existing ditches or construct the proposed ditched prior to a rain event, then the BMPs should be sized according to the watersheds and flows presented.

Equation 2. Run-on Discharge Equation

$Q = CiA$

Where:

Q = Site Area Run-on Discharge (cfs)
C = Area Runoff Coefficient
i = Area Rainfall Intensity (in/hr) = 1.471
A = Drainage Area (ac)

Figure 10. Run-on Discharge Calculations

Watershed 1:		**118.020 ac**			
Area (ac)	C	Intensity (2-yr, 5-min)	C*A	Weighted C	Q=CiA (cfs)
82.07	0.32	1.471	26.263		
2.70	0.40	1.471	1.078		
2.49	0.32	1.471	0.796		
1.97	0.40	1.471	0.789		
5.77	0.32	1.471	1.846		
8.27	0.50	1.471	4.137		
0.89	0.50	1.471	0.446		
1.68	0.50	1.471	0.838		
0.64	0.50	1.471	0.318		
0.64	0.50	1.471	0.318		
0.12	0.32	1.471	0.038		
0.10	1.00	1.471	0.095		
10.70	1.00	1.471	10.703		
			47.666	**0.40**	**70.1169**

Watershed 2:		**293.506 ac**			
Area (ac)	C	Intensity (2-yr, 5-min)	C*A	Weighted C	Q=CiA (cfs)
32.51	0.36	1.471	11.705		
13.60	0.40	1.471	5.442		
17.06	0.40	1.471	6.825		
3.69	0.40	1.471	1.476		
21.88	0.40	1.471	8.752		
44.91	0.32	1.471	14.372		
2.22	0.40	1.471	0.887		
2.68	0.40	1.471	1.073		
12.09	0.50	1.471	6.044		
0.49	0.40	1.471	0.195		
1.71	0.40	1.471	0.684		
13.93	0.32	1.471	4.458		
7.79	0.40	1.471	3.117		
0.92	0.40	1.471	0.366		
21.05	0.32	1.471	6.735		
0.33	0.40	1.471	0.134		
87.82	0.48	1.471	42.153		
1.59	0.32	1.471	0.509		
2.82	1.00	1.471	2.822		
4.40	1.00	1.471	4.405		
			122.154	**0.42**	**179.688**

Watershed 3:		**524.035 ac**			
Area (ac)	C	Intensity (2-yr, 5-min)	C*A	Weighted C	Q=CiA (cfs)
299.12	0.32	1.471	95.719		
14.35	0.40	1.471	5.742		
32.60	0.40	1.471	13.039		
1.80	0.40	1.471	0.721		
57.86	0.48	1.471	27.772		
69.00	0.40	1.471	27.601		
9.62	0.45	1.471	4.328		
4.65	0.40	1.471	1.859		
1.25	0.40	1.471	0.499		
1.25	0.40	1.471	0.502		
2.12	0.40	1.471	0.849		
3.50	0.40	1.471	1.401		
3.75	0.32	1.471	1.200		
3.46	0.40	1.471	1.382		
19.70	1.00	1.471	19.699		
			202.314	**0.39**	**297.6034**

Watershed 4:		813.171 ac			
Area (ac)	C	Intensity (2-yr, 5-min)	C*A	Weighted C	Q=CiA (cfs)
512.11	0.48	1.471	245.812		
19.01	0.40	1.471	7.605		
5.32	0.40	1.471	2.128		
0.85	0.40	1.471	0.340		
64.45	0.32	1.471	20.623		
27.24	0.40	1.471	10.897		
30.69	0.40	1.471	12.278		
15.55	0.40	1.471	6.220		
17.05	0.34	1.471	5.796		
24.19	0.32	1.471	7.742		
11.10	0.40	1.471	4.440		
5.23	0.60	1.471	3.140		
1.20	0.40	1.471	0.480		
1.14	0.40	1.471	0.457		
59.75	0.32	1.471	19.121		
5.37	0.32	1.471	1.720		
4.07	0.40	1.471	1.627		
3.62	1.00	1.471	3.620		
5.22	1.00	1.471	5.221		
			359.264	**0.44**	**528.4777**

Watershed 5:		237.117 ac			
Area (ac)	C	Intensity (2-yr, 5-min)	C*A	Weighted C	Q=CiA (cfs)
151.22	0.32	1.471	48.391		
84.34	0.48	1.471	40.481		
1.56	1.00	1.471	1.561		
			90.433	**0.38**	**133.0265**

Watershed 6:		360.309 ac			
Area (ac)	C	Intensity (2-yr, 5-min)	C*A	Weighted C	Q=CiA (cfs)
62.74	0.32	1.471	20.078		
103.05	0.48	1.471	49.466		
66.02	0.50	1.471	33.009		
88.43	0.32	1.471	28.299		
23.80	0.40	1.471	9.522		
0.41	0.32	1.471	0.130		
2.17	1.00	1.471	2.168		
4.69	0.50	1.471	2.344		
4.15	0.40	1.471	1.659		
2.29	1.00	1.471	2.289		
2.44	1.00	1.471	2.442		
0.11	1.00	1.471	0.113		
			151.519	**0.42**	**222.8843**

TOTAL WATERSHED AREA	**2346.158 ac**
TOTAL FLOW	**1431.797 cfs**

5 PROJECT REGISTRATION DOCUMENTS

To obtain permit coverage under the CGP, all dischargers must electronically file PRDs, NOTs, changes of information, sampling and monitoring information, annual reporting, and other compliance documents required by this CGP through the SWRCB's SMARTS. The contractor will have to coordinate these submittals with Caltrans within the timeframe allotted in the contract special provisions and as specified in the permit. SMARTS is found under the following website:

https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

PRDs include the following information:

1. Notice of Intent (NOI)
2. Site Map(s) Includes:
    a. The project's surrounding area (vicinity)
    b. Site layout
    c. Construction site boundaries
    d. Drainage areas
    e. Discharge locations
    f. Sampling locations
    g. Areas of soil disturbance (temporary or permanent)
    h. Active areas of soil disturbance (cut or fill)
    i. Locations of all runoff BMPs
    j. Locations of all erosion control BMPs
    k. Locations of all sediment control BMPs
    l. Locations of sensitive habitats, watercourses, or other features which are not to be disturbed
    m. Locations of all post-construction BMPs
    n. Locations of storage areas for waste, vehicles, service, loading/unloading of materials, access (entrance/exits) points to construction site, fueling and water storage, water transfer for dust control and compaction practices

3. SWPPPs

4. Risk Assessment

a. The Standard Risk Assessment includes utilization of the following:
    i. Receiving water Risk Assessment interactive map
    ii. EPA Rainfall Erosivity Factor Calculator Website
    iii. Sediment Risk interactive map
    iv. Sediment sensitive water bodies list

b. The Site-Specific Risk Assessment includes the completion of the hand-calculated R value Risk Calculator

5. **Post-Construction Water Balance Calculator**
    a. Because Discharger is in an unincorporated area of the State (not covered under an adopted Phase I or II SUSMP requirement)
    b. Standard spreadsheet is found in Appendix 2 of the CGP

5.1 General Information Included

The following is a list of information included in this Storm Water Information Handout that can be used for the PRDs:

- Vicinity Map (included as Figure 1 of this document)
- Risk Assessment (included in Section 3 of this document)

5.2 Storm Water Pollution Prevention Plan

The contractor for the Project is required to prepare a Storm Water Pollution Prevention Plan (SWPPP) because the Project involves disturbing more than 1 ac of soil. The SWPPP must include the following information:

- Active areas of cut and fill
- Areas of soil disturbance (temporary and permanent)
- Locations of storage areas for waste, vehicles, access, etc.
- Locations of all runoff BMPs
- Locations of all erosion control BMPs
- Locations of all sediment control BMPs

The SWPPP should be submitted with the Project Registration Documents and will be forthcoming from the Contractor.

5.3 Notice of Intent (NOI)

The NOI must be submitted once the contractor submits the SWPPP. This document is included in Appendix A.

5.4 Site Maps

Registration requirements can be met by the inclusion of the following plans, which can be found in the appendices.

- Conceptual Sampling Plan (Appendix B)
  - Discharge Locations (Subject to changes by the Contractor and approved by the Resident Engineer)
  - Sampling Locations (Subject to changes by the Contractor and approved by the Resident Engineer)

- Off-site Watershed Map (Appendix C)

Appendix A Notice of Intent (NOI)

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Attachment 2

State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ ORDER No. 99-08-DWQ)

I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM 1. ☒ New Construction 2. ☐ Change of Information for WDID#

II. PROPERTY OWNER

Name	Contact Person		
California Department of Transportation	Bijan Sartipi		
Mailing Address	Title		
111 Grand Avenue	District Director		
City	State	Zip	Phone
Oakland	CA	94623	(510) 286-5900

Owner Type (*check one*) 1.[ ] Private Individual 2.[ ]Business 3.[ ]Municipal 4.[X]State 5.[ ]Federal 6.[ ]Other

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name	Site Contact Person		
SR 152/Ferguson Road Realignment and Signalization			
Physical Address/Location	Latitude	Longitude	County
Intersection of SR 152 and Ferguson Road	37.009 °	-121.52 °	Santa Clara
City (or nearest City)	Zip	Site Phone Number	Emergency Phone Number
Gilroy	95020		

A. Total size of construction site area: _____ Acres

B. Total area to be disturbed: 4.3 Acres (% of total _____)

C. Percent of site imperviousness (including rooftops):
Before Construction: _____%
After Construction: _____%

D. Tract Number(s): _____, _____

E. Mile Post Marker: 12.6/13.0

F. Is the construction site part of a larger common plan of development or sale?
☐ YES ☒ NO

G. Name of plan or development:

H. Construction commencement date: 11 / 8 / 2011

I. % of site to be mass graded: _____

J. Projected construction dates:
Complete grading: ____/____/____ Complete project: 11 / 7 / 2012

K. Type of Construction (Check all that apply):

1. ☐ Residential 2. ☐ Commercial 3. ☐ Industrial 4. ☐ Reconstruction 5. ☒ Transportation
6. ☐ Utility Description: _____ 7. ☐ Other (Please List): _____

V. BILLING INFORMATION

SEND BILL TO:	Name	Contact Person	
☒ OWNER (as in II. above)			
☐ DEVELOPER (as in III. above)	Mailing Address	Phone/Fax	
☐ OTHER (enter information at right)	City	State	Zip

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan? ☒ YES ☐ NO

Does the erosion/sediment control plan address construction activities such as infrastructure and structures? ☒ YES ☐ NO

Name of local agency: California Department of Transportation Phone: _____

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit of 401 Water Quality Certification? ☒ YES ☐ No

If yes, provide details: 404 permit and 401 certification

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

1. ☒ **Indirectly to waters of the U.S.**
2. ☐ **Storm drain system - Enter owner's name:** _____
3. ☒ **Directly to waters of U.S. (e.g. , river, lake, creek, stream, bay, ocean, etc.)**

B. Name of receiving water: (river, lake, creek, stream, bay, ocean): Johnson Creek, Dexter Creek, Llagas Creek, Pajaro River

VIII. IMPLEMENTATION OF NPDES PERMIT REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (check one)

☐ A SWPPP has been prepared for this facility and is available for review: Date Prepared: ____/____/____ Date Amended: ____/____/____

☒ A SWPPP will be prepared and ready for review by (enter date): ____/____/____

☐ A tentative schedule has been included in the SWPPP for activities such as grading, street construction, home construction, etc.

B. MONITORING PROGRAM

☐ A monitoring and maintenance schedule has been developed that includes inspection of the construction BMPs before anticipated storm events and after actual storm events and is available for review.

If checked above: A qualified person has been assigned responsibility for pre-storm and post-storm BMP inspections to identify effectiveness and necessary repairs or design changes ☐ YES ☐ NO

Name: _____ Phone: _____

C. PERMIT COMPLIANCE RESPONSIBILITY

A qualified person has been assigned responsibility to ensure full compliance with the Permit, and to implement all elements of the Storm Water Pollution Prevention Plan including:

1. Preparing an annual compliance evaluation ☐ YES ☐ NO

Name: _____ Phone: _____

2. Eliminating all unauthorized discharges ☐ YES ☐ NO

IX. VICINITY MAP AND FEE (must show site location in relation to nearest named streets, intersections, etc.)

Have you included a vicinity map with this submittal? ☒ YES ☐ NO

Have you included payment of the annual fee with this submittal? ☐ YES ☐ NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. In addition, I certify that I have read the entire General Permit, including all attachments, and agree to comply with and be bound by all of the provisions, requirements, and prohibitions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

Printed Name: _____

Signature: _____ **Date:** _____

Title: _____

Appendix B Sampling Plan

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FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl	152	12.6/13.0		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

F. H. WU No. 31258 Exp. 9-03-06 CIVIL STATE OF CALIFORNIA

NOTES:

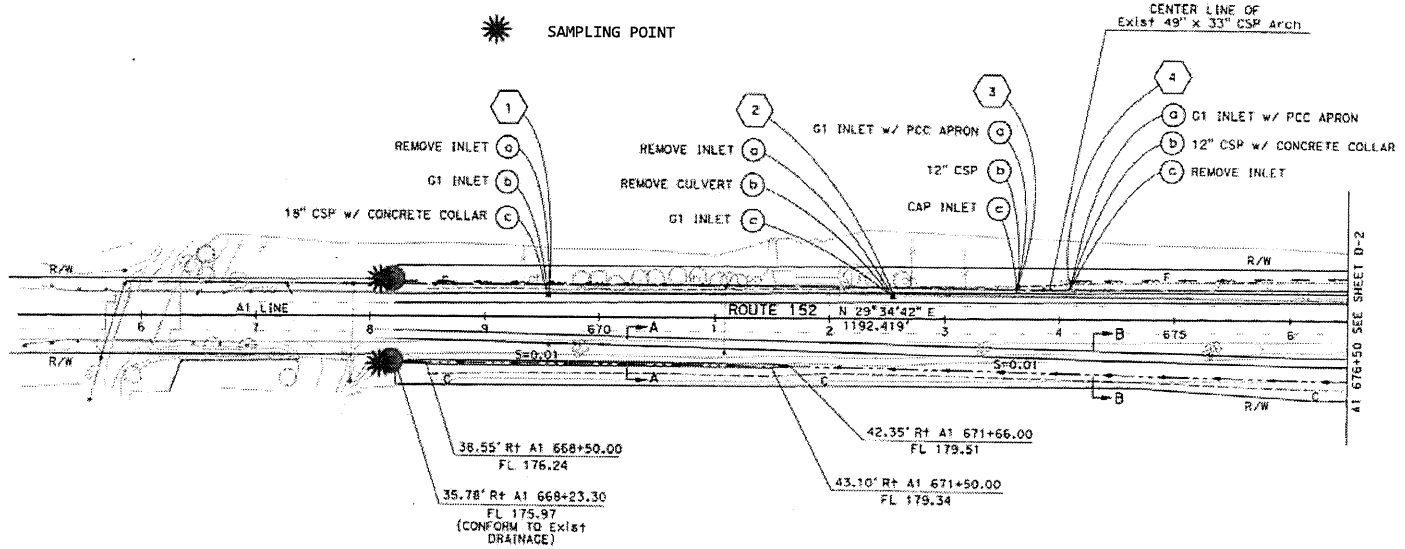
1. LOCATIONS OF EXISTING DRAINAGE FACILITIES ARE APPROXIMATE. WHERE A PROPOSED DRAINAGE SYSTEM CONNECTS TO AN EXISTING DRAINAGE FACILITY, THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND INVERT ELEVATION OF THE EXISTING FACILITY. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEER PRIOR TO CONSTRUCTING ANY PORTION OF THE PROPOSED DRAINAGE SYSTEM.
2. LOCATIONS OF CULVERT INLETS, OUTLETS, TOP OF GRATE ELEVATIONS AND LENGTHS OF CULVERTS AS SHOWN SUBJECT TO CHANGE BY THE ENGINEER BASED ON ACTUAL FIELD CONDITIONS.
3. FLOOR ELEVATIONS AND OFFSET AS SHOWN ARE SUBJECT TO CHANGE BY THE ENGINEER BASE ON ACTUAL FIELD CONDITIONS.

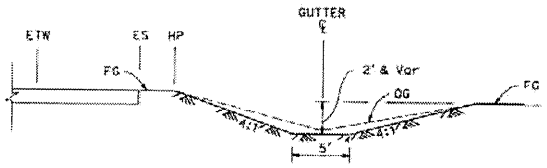
LEGEND:

- (No.) DRAINAGE SYSTEM NUMBER
- (a) DRAINAGE UNIT
- GUTTER CENTER LINE
- GRADE TO DRAIN
- DISCHARGE POINT
- SAMPLING POINT

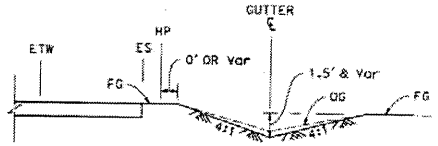
ABBREVIATION:

w/ WITH





SECTION A-A (TYPICAL)



SECTION B-B (TYPICAL)

DRAINAGE PLAN

SCALE: 1" = 50'

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY

D-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS
FUNCTIONAL SUPERVISOR: YUANZHENG GE
CALCULATED-DESIGNED BY: FANG HONG WU
CHECKED BY: YUANZHENG GE
REVISED BY
DATE REVISED

USER NAME = DATE PLOTTED = 07-05-10
TIME PLOTTED =

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME = s31729
DGN FILE = 42a260Ed001.dgn

CU 04230

EA 2A2601

FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

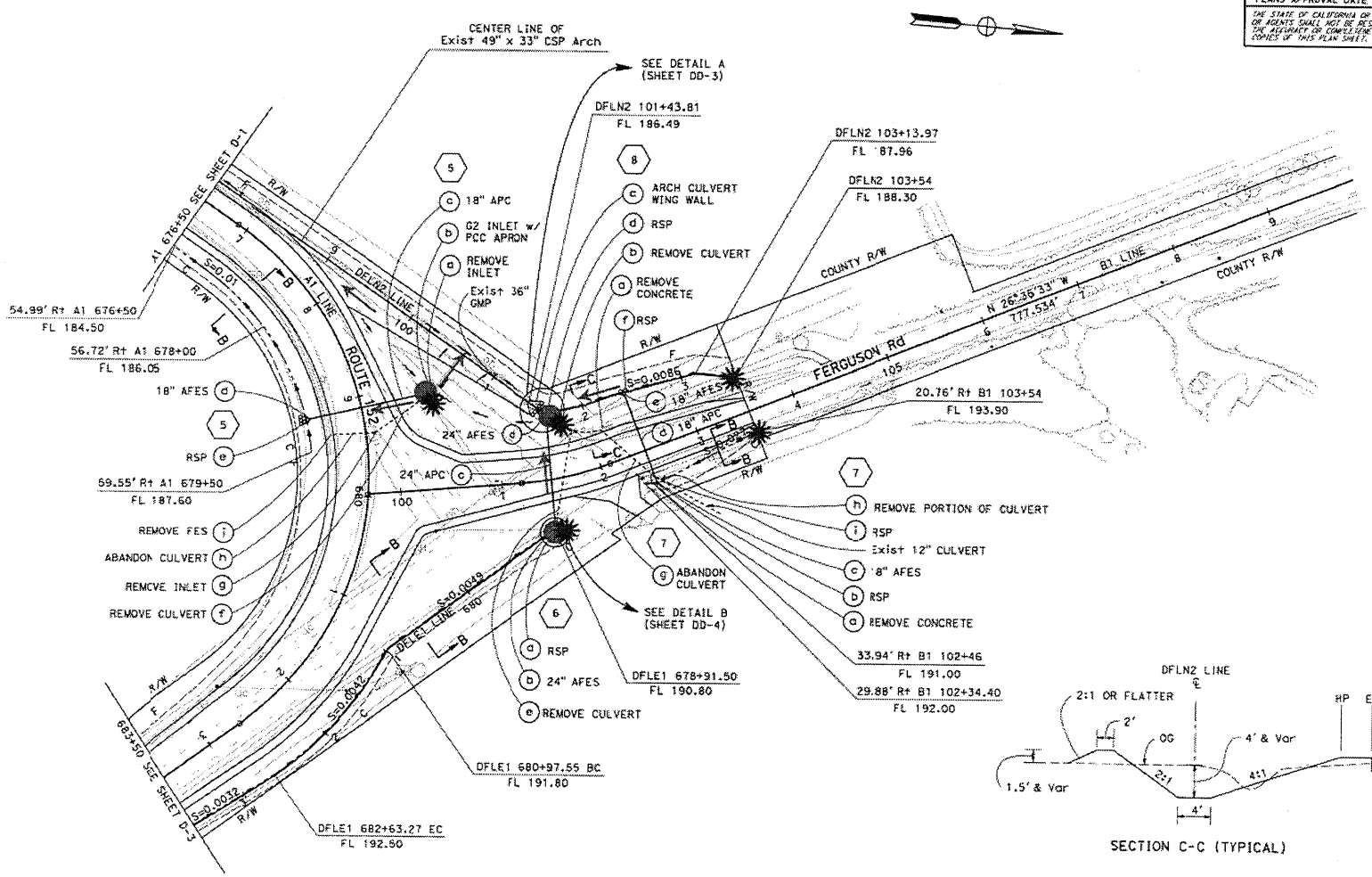
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI	152	12.6/13.0		

REGISTERED CIVIL ENGINEER DATE

F.H. WU No. 31258 Exp. 9-03-06 CIVIL

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



SECTION C-C (TYPICAL)

DRAINAGE PLAN

SCALE: 1" = 50'

D-2

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET D-2

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans HYDRAULICS
FUNCTIONAL SUPERVISOR: YUANZHENG GE
CALCULATED-DESIGNED BY: FANG HONG WU
CHECKED BY: YUANZHENG GE
REVISED BY
DATE REVISED

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

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DGN FILE => 42a2601a002.dgn

CU 04230

EA 2A2601

LAST REVISION 07-05-10 DATE PLOTTED => 09-JUL-2010 TIME PLOTTED => 15:41

FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

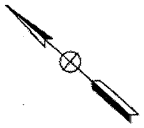
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl	152	12.6/13.0		

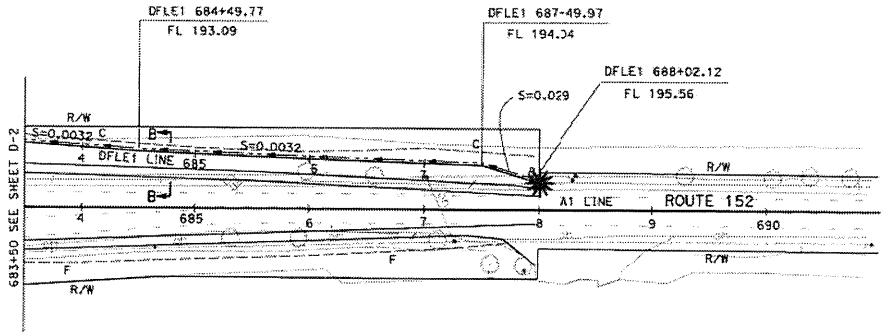
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER F. H. WU No. 31258 Exp. 9-03-06 CIVIL STATE OF CALIFORNIA





FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET D-1

DRAINAGE PLAN

SCALE: 1" = 50'

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY

D-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS
FUNCTIONAL SUPERVISOR: YUANZHENG GE
CALCULATED-DESIGNED BY: FANG HONG WU
CHECKED BY: YUANZHENG GE
REVISED BY
DATE REVISED

BORDER LAST REVISED 4/11/2006

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DGN FILE => 42a2601a003.dgn

CU 04230

EA 2A2601

DATE PLOTTED => 09-JUL-2010
TIME PLOTTED => 10:39

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Appendix C Off-Site Watershed Map

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813 ac
C= 0.4
520 cfs
360 ac
C= 0.42
223 cfs
237 ac
C= 0.38
133 cfs
293 ac
C= 0.42
180 cfs
524 ac
C= 0.39
298 cfs
118 ac
C= 0.4
70 cfs